

DEPARTMENT OF AGRICULTURE
CANADA

REPORT

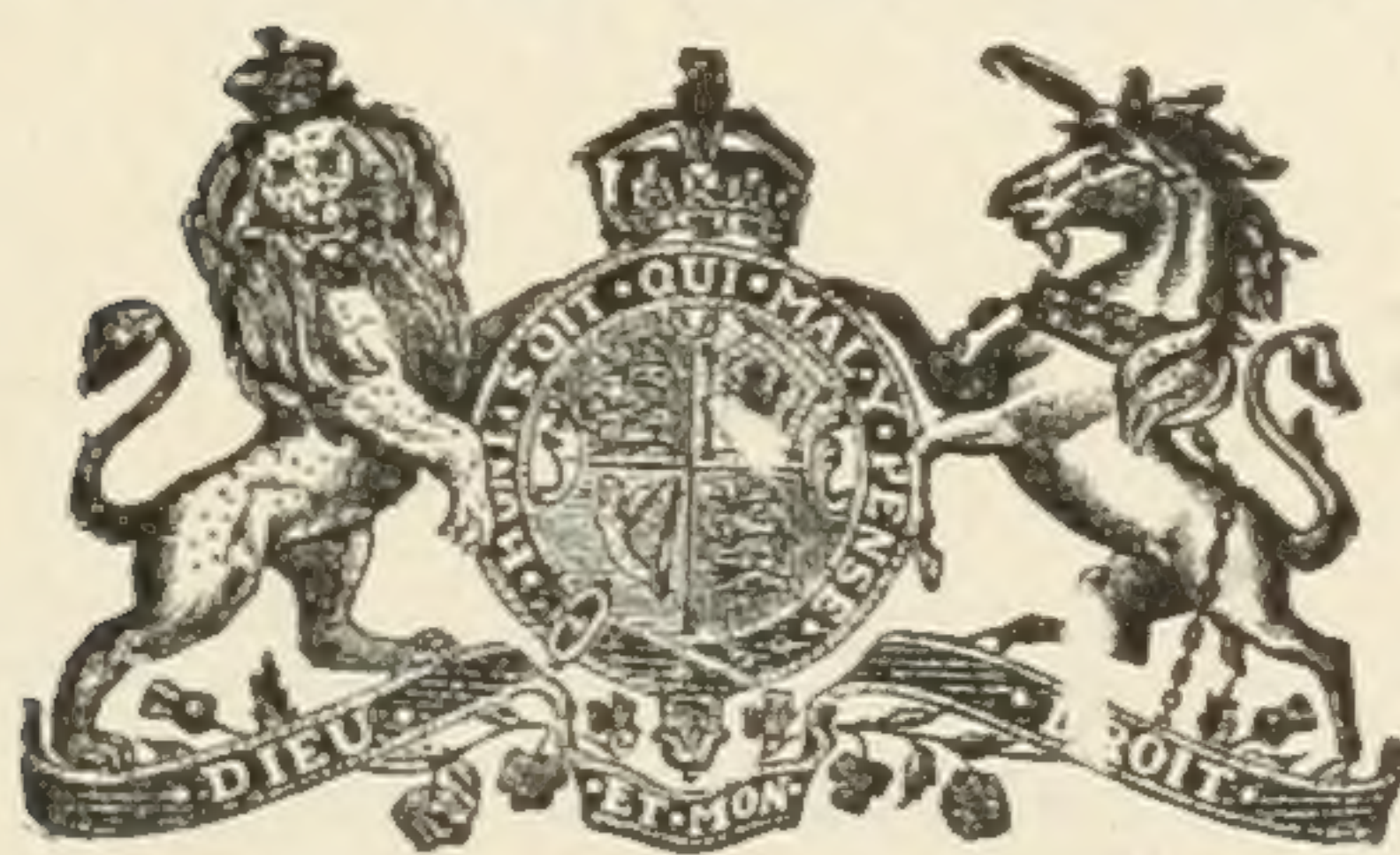
OF THE

VETERINARY DIRECTOR GENERAL

(F. TORRANCE, B.A., D.V.S.)

FOR THE YEAR ENDING MARCH 31, 1913

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

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EXCELLENT MAJESTY

1913

REPORT

OF THE

VETERINARY DIRECTOR GENERAL.

SIR,—I have the honour to present my report as Veterinary Director General for the year ending March 31, 1913.

During the interval between my appointment on August 1, 1912, and the resignation of my predecessor, Dr. Rutherford, on April 1, 1912, the Health of Animals Branch was in charge of Dr. G. Hilton, as Acting Veterinary Director General, whose report is printed herewith.

On assuming office, I found the work of the Branch carried on in a very efficient manner, the various employees performing their duties satisfactorily, and a spirit of loyalty and earnestness pervading the service. This state of affairs is continuing at the present time and I take the opportunity of thanking the other members of the service for their hearty co-operation with me in the work of the Branch, and would especially mention Dr. Hilton, Chief Veterinary Inspector, and Dr. Barnes, Chief Meat Inspector.

The offices of Veterinary Director General and Live Stock Commissioner were combined under my predecessor, and I assumed control of both branches until December 1, 1913, when the offices were separated and Mr. John Bright was appointed Live Stock Commissioner. During the brief period I occupied the dual position, I was ably assisted by Mr. H. S. Arkell, Assistant Live Stock Commissioner, to whom, as well as the other members of the Live Stock Branch, I desire to offer my thanks.

The work of the Branch in the Contagious Diseases Division shows satisfactory progress to have been made in control work in the great majority of the diseases we have undertaken to control. Glanders, mange, rabies and dourine are markedly less prevalent than in previous years. Hog cholera shows an increase, the cause of which is discussed elsewhere. Tuberculosis of cattle is practically unchanged, no systematic efforts at control having yet been attempted, but valuable information has been acquired which should be useful in making plans for the future. Detailed statements of each of the diseases follow.

GLANDERS.

The policy of slaughter, with compensation, of all reactors to the mallein test, with careful supervision of all contact animals, inaugurated by my predecessor, is giving further evidence of success. Outbreaks in Canada have been fewer in number than in the preceding year, and in the province of Saskatchewan, which formerly had more cases than all the rest of the Dominion, there is a diminution from 722, in 1912, to 428, in 1913. Alberta shows a considerable increase from 50, in 1912, to 152, in 1913. This is probably due to the same causes that have occasioned the former prevalence of the disease in the sister province, and may be expected to reach a

4 GEORGE V., A. 1914

maximum and decline. In other parts of Canada there has been almost uniformly a decline. The following are the statistics for the disease:—

STATISTICS.

DOMINION.

| | |
|------------------------------|-----|
| Killed on inspection.. . . . | 6 |
| “ at 1st test.. . . . | 554 |
| “ at 2nd test.. . . . | 70 |
| “ 3rd test.. . . . | 7 |
| “ 4th test.. . . . | 1 |

Total (valued at \$90,407.50, at a cost of \$60,271.65).. . . 638

209 showed clinical symptoms.

22,829 horses were tested with mallein, of which 632 reacted and were destroyed.

Of the 632 reactors, 203 showed clinical symptoms of glanders at or during the test.

245 horses are under control for retest.

Of the above 638 horses slaughtered, 4 were killed, without compensation, as being diseased when imported into Canada.

PRINCE EDWARD ISLAND.

1 horse was tested and proved to be healthy.

NOVA SCOTIA.

26 horses were tested and proved to be healthy.

NEW BRUNSWICK.

10 horses killed at first test, valued at \$1,300, at a cost of \$866.65.

2 showed clinical symptoms.

205 horses were tested with mallein, of which 10 reacted and were destroyed.

Of the 10 reactors 2 showed clinical symptoms of glanders at or during the test.

No horses are under control for retest.

Of the 10 horses slaughtered—

2 were in the electoral district of Kent.

8 were in the electoral district of Sunbury and Queens.

QUEBEC.

| | |
|------------------------------|----|
| Killed on inspection.. . . . | 2 |
| “ at 1st test.. . . . | 14 |
| “ at 2nd test.. . . . | 1 |

Total (valued at \$2,392.50, at a cost of \$1,595).. . . 17

10 showed clinical symptoms.

691 horses were tested with mallein, of which 15 reacted and were destroyed.

Of the 15 reactors, 8 showed clinical symptoms of glanders at or during the test.

No horses are under control for retest.

SESSIONAL PAPER No. 15b

Of the 17 horses slaughtered—

| | | |
|---|-----------------------------------|----------------|
| 6 | were in the electoral district of | Labelle. |
| 6 | " | Quebec. |
| 1 | was | Joliette. |
| 1 | " | Two Mountains. |
| 1 | " | Maisonneuve. |
| 1 | " | Drummond. |
| 1 | " | Terrebonne. |

ONTARIO.

Killed at 1st test, 7, valued at \$1,050, at a cost of \$700.

5 showed clinical symptoms.

1,036 horses were tested with mallein, of which 7 reacted and were destroyed.

Of the 7 reactors, 5 showed clinical symptoms of glanders at or during the test.

4 horses are under control for retest.

Of the 7 horses slaughtered—

| | | |
|---|-----------------------------------|-----------------------|
| 3 | were in the electoral district of | Algoma. |
| 1 | was | Hastings. |
| 1 | " | Russell. |
| 1 | " | Nipissing. |
| 1 | " | Lennox and Addington. |

MANITOBA.

| | |
|----------------------------|----|
| Killed at 1st test.. . . . | 18 |
| " 2nd test.. . . . | 5 |
| " 4th test.. . . . | 1 |

| | |
|---|----|
| Total (valued at \$3,045, at a cost of \$2,030).. . . . | 24 |
|---|----|

1 showed clinical symptoms.

3,185 horses were tested with mallein, of which 24 reacted and were destroyed.

Of the 24 reactors, 1 showed clinical symptoms of glanders at or during the test.

No horses are under control for retest.

Of the 24 horses slaughtered—

| | | |
|----|-----------------------------------|-------------|
| 14 | were in the electoral district of | Souris. |
| 8 | " | Macdonald. |
| 1 | was | Dauphin. |
| 1 | " | Provencher. |

SASKATCHEWAN.

| | |
|------------------------------|-----|
| Killed on inspection.. . . . | 3 |
| " at 1st test.. . . . | 364 |
| " at 2nd test.. . . . | 54 |
| " at 3rd test.. . . . | 7 |

| | |
|---|-----|
| Total (valued at \$61,425, at a cost of \$40,950).. . . . | 428 |
|---|-----|

141 showed clinical symptoms.

11,417 horses were tested with mallein, of which 425 reacted and were destroyed.

Of the 425 reactors, 138 showed clinical symptoms of glanders at or during the test.

4 GEORGE V., A. 1914

144 horses are under control for retest.

Of the 428 horses slaughtered—

| | |
|----|---|
| 91 | were in the electoral district of Regina. |
| 73 | " " Battleford. |
| 75 | " " Humboldt. |
| 45 | " " Moosejaw. |
| 84 | " " Mackenzie. |
| 14 | " " Saskatoon. |
| 22 | " " Assiniboia. |
| 4 | " " Prince Albert. |
| 20 | " " Qu'Appelle. |

ALBERTA.

| | |
|------------------------------|-----|
| Killed on inspection.. . . . | 1 |
| " at 1st test.. . . . | 141 |
| " at 2nd test.. . . . | 10 |

Total (valued at \$21,195, at a cost of \$14,130).. . . . 152

51 showed clinical symptoms.

4,302 horses were tested with mallein, of which 151 reacted and were destroyed.

Of the 151 reactors, 50 showed clinical symptoms of glanders at or during the test.

97 horses are under control for retest.

Of the 152 horses slaughtered—

| | |
|----|--|
| 2 | were in the electoral district of Macleod. |
| 63 | " " " Red Deer. |
| 83 | " " " Medicine Hat. |
| 2 | " " " Calgary. |
| 1 | was " " Edmonton. |
| 1 | " " " Victoria. |

BRITISH COLUMBIA.

1,963 horses were tested with mallein, all of which proved to be healthy.

YUKON TERRITORY.

2 horses were tested with mallein and proved to be healthy.

UNORGANIZED TERRITORY.

1 horse was tested for 3rd time and passed as healthy.

HOG CHOLERA.

The increase in hog cholera during the past year, amounting to practically double that of the previous year, while not alarming, is sufficient to occasion careful inquiry as to its cause. This has been done with every outbreak, and it has been found that, with a few exceptions, the probable source of infection has been uncooked bits of pork rind, &c., which have been eaten by hogs fed on garbage.

Hogs have been scarce in Canada during the past year. Pork has been high, and, in consequence, large quantities of pork, hams and bacon have been imported from

SESSIONAL PAPER No. 15b

the United States. Hog cholera has been, at the same time, much more prevalent there than usual; the 'worst in twenty years,' I was told by one of the state veterinarians.

Numbers of hogs in the incubative stage of the disease are slaughtered and their carcasses passed for human consumption. There seems to be no valid reason for condemning this practice from the standpoint of human hygiene, as such pork has apparently no bad effect on the human consumer. This pork, however, seems easily to convey infection to live hogs, unless it has previously been cooked. The processes of pickling and smoking do not appear to kill the infection.

It is to be hoped that, with an increased production of Canadian pork, there will be less imported, and consequently a lessening of the chances of hog cholera infection.

As a result of inquiries into the use of artificial immunity as a means of control of this disease, I arrived at the conclusion that the method is unsuited to our conditions in Canada, and if permitted would expose our herds to a possible new source of infection—the immune carrier of the virus. I therefore recommended that the method should be prohibited in Canada and, in consequence, the following Order in Council was passed:—

"The use of Hog Cholera serum, or virus, being considered a source of danger, the importation, manufacture, sale or use of such serum or virus is prohibited."

STATISTICS.

In the Dominion, 8,466 hogs, valued at \$79,179.46, were destroyed as diseased, at a cost of \$52,785.94 in compensation.

NEW BRUNSWICK.

One outbreak of hog cholera occurred in New Brunswick, in which 26 hogs, valued at \$408, were destroyed at Fairvale, at a cost of \$271.99 in compensation.

One owner's premises were also quarantined on suspicion, involving the control of 58 hogs.

One hog, valued at \$8, was destroyed for purposes of examination, but no evidence of hog cholera was found.

ONTARIO.

Two hundred and twenty-four outbreaks of hog cholera occurred in Ontario, in which 4,851 hogs, valued at \$41,947.50, were destroyed in the undermentioned districts, at a cost of \$27,964.95 in compensation.

Forty-six premises were also quarantined on suspicion, involving the control of 419 hogs.

Two hogs, valued at \$24, were destroyed for purposes of examination, but no evidence of hog cholera was found.

| District— | No. of Outbreaks. | Hogs Destroyed. |
|--------------------------------------|----------------------|--------------------|
| Essex, N.R. | 142 | 2,683 |
| " S.R. | 21 | 531 |
| Welland. | 7 | 65 |
| Thunder Bay and Rainy River. | 54 | 1,572 |
| Total. | 224 | 4,851 |

4 GEORGE V., A. 1914

MANITOBA.

Fifteen outbreaks of hog cholera occurred in Manitoba, in which 249 hogs, valued at \$2,524, were destroyed in the undermentioned districts, at a cost of \$1,682.66 in compensation.

Fifteen premises were also quarantined on suspicion, involving the control of 256 hogs.

Five hogs, valued at \$43 were destroyed for purposes of examination, but no evidence of hog cholera was found.

| District— | No. of Outbreaks. | Hogs Destroyed. |
|--------------------|-------------------|-----------------|
| Winnipeg.. . . . | 1 | 17 |
| Provencher.. . . . | 4 | 154 |
| Selkirk.. . . . | 2 | 17 |
| Macdonald.. . . . | 1 | 28 |
| Lisgar | 7 | 33 |
| Total.. . . . | 15 | 249 |

SASKATCHEWAN.

Eighty-five outbreaks of hog cholera occurred in Saskatchewan, in which 1,414 hogs, valued at \$12,700.55, were destroyed in the undermentioned districts, at a cost of \$8,467 in compensation.

Sixty-three premises were also quarantined on suspicion, involving the control of 563 hogs.

Two hogs, valued at \$11, were destroyed for purposes of examination, but no evidence of hog cholera was found.

| District— | No. of Outbreaks. | Hogs Destroyed. |
|-----------------------|-------------------|-----------------|
| Regina.. . . . | 13 | 269 |
| Moosejaw.. . . . | 52 | 884 |
| Saskatoon.. . . . | 17 | 216 |
| Prince Albert.. . . . | 3 | 45 |
| Total.. . . . | 85 | 1,414 |

ALBERTA.

Thirteen outbreaks of hog cholera occurred in Alberta, in which 343 hogs, valued at \$4,377.25, were destroyed in the undermentioned districts, at a cost of \$2,918.15 in compensation.

Ten premises were also quarantined on suspicion, involving the control of 543 hogs.

One hog, valued at \$15, was destroyed for purposes of examination, but no evidence of hog cholera was found.

| District— | No. of Outbreaks. | Hogs Destroyed. |
|----------------------|-------------------|-----------------|
| Calgary.. . . . | 2 | 36 |
| Medicine Hat.. . . . | 9 | 291 |
| Macleod.. . . . | 2 | 16 |
| Total.. . . . | 13 | 343 |

SESSIONAL PAPER No. 15b

BRITISH COLUMBIA.

One hundred and eleven outbreaks of hog cholera occurred in British Columbia, in which 1,583 hogs, valued at \$17,222.16, were destroyed in the undermentioned districts, at a cost of \$11,481.19 in compensation.

Ninety-three premises were also quarantined on suspicion, involving the control of 1,200 hogs.

One hog, valued at \$8, was destroyed for purposes of examination, but no evidence of hog cholera was found.

| District— | No. of Outbreaks. | Hogs Destroyed. |
|-------------------------|----------------------|--------------------|
| Vancouver.. . . . | 2 | 61 |
| Huntingdon.. . . . | 2 | 29 |
| Comox-Atlin.. . . . | 9 | 90 |
| Yale-Cariboo.. . . . | 21 | 425 |
| Victoria.. . . . | 10 | 81 |
| New Westminster.. . . . | 20 | 367 |
| Nanaimo.. . . . | 34 | 376 |
| Kootenay.. . . . | 13 | 154 |
| Total.. . . . | 111 | 1,583 |

TUBERCULOSIS.

No marked advance has characterized the relation of the department to this disease during the past year. Information has been accumulated which will be of use in forming plans for its control, a task which should soon be undertaken. Public opinion is gaining strength in favour of more stringent measures for its control and, in my opinion, a moderate, fair and reasonable regulation would meet with comparatively little opposition.

Many other countries have recently adopted new regulations dealing with tuberculosis, and the result of the operation of these laws is being carefully observed with a view to the adoption of whatever line of control is proving successful and suited to Canadian conditions.

An increased demand for testing of herds is an indication of the public awakening to the injury the disease is inflicting on the farming community, and it is gratifying to note a larger number of stock breeders voluntarily placing their herds under the control of the department for the elimination of the disease.

In response to a request from the Government of British Columbia, the department has undertaken to test free of charge, all pure-bred cattle purchased in other provinces of Canada and imported into British Columbia. This may appear, at first sight, as a discrimination between one province and another, but consideration of the facts will show that special reasons exist which justify this action.

British Columbia has for some years been actively endeavouring to control bovine tuberculosis within her borders, and maintains a staff of veterinary inspectors to test the herds and eliminate the diseased animals, for which compensation is paid.

Much progress had been made along this line when it was found that sometimes the disease was introduced in animals purchased in other provinces for the improvement of stock. When such animals were destroyed the province was asked to pay compensation, and it appeared unfair that the British Columbia funds should be used to pay for a diseased animal which originated in another province. A request was made that the Dominion authority should assist British Columbia by preventing

diseased cattle from crossing the border, and after careful inquiry into all the circumstances, the request was granted and the following Order in Council passed:—

“No common carrier shall receive for shipment or carry into the Province of British Columbia, any registered pure bred cattle, unless the same are accompanied by a certificate signed by an inspector setting forth that within thirty days prior to the date of shipment they have been submitted to and have passed the tuberculin test.”

Under this arrangement there have been tested, up to the present, 186 head, of which 3 reacted.

STATISTICS.

- 698 cattle were tested on being imported into Canada, 5 of which reacted, 4 were classed as suspicious and 689 proved healthy.
 - 1,082 cattle were tested for export, 11 of which reacted, 8 were classed as suspicious, and 1,063 proved healthy.
 - 3,839 cattle were tested by private practitioners with tuberculin supplied by this Branch, 151 of which reacted, 84 were classed as suspicious, and 3,604 proved healthy.
 - 1,254 cattle were tested, some for shipment to different provinces of the Dominion, and others in herds under the supervision of this department, 23 of which reacted, 18 were classed as suspicious, and 1,214 proved healthy.
- All reactors were permanently earmarked by a veterinary inspector, in cases where the owner did not voluntarily destroy them.

MANGE IN CATTLE.

This disease is gradually diminishing. We still have certain areas in Saskatchewan, Alberta and British Columbia under quarantine, but there are indications that it will be possible largely to reduce the area in the near future.

STATISTICS.

| Province. | Outbreaks. | Animals affected. | Animals quarantined. |
|----------------------|------------|-------------------|----------------------|
| Ontario..... | 1 | 7 | 55 |
| Saskatchewan..... | 34 | 1,192 | 16,162 |
| Alberta..... | 137 | 2,122 | 63,513 |
| British Columbia ... | ..... | ..... | 2,947 |
| | 172 | 3,321 | 82,677 |

- 50,143 cattle were inspected on being presented for shipment from the quarantined areas in Saskatchewan, Alberta, and British Columbia.
- 81,770 cattle were inspected in Winnipeg, on arrival from points west thereof.

MANGE IN HORSES.

A great reduction will be noticed in the figures for this year, compared with the previous one.

STATISTICS.

| Province. | Outbreaks. | Animals affected. | Animals quarantined. |
|------------------------|------------|-------------------|----------------------|
| Quebec | 14 | 18 | 33 |
| Ontario | 2 | 4 | 10 |
| Manitoba | 2 | 8 | 42 |
| Saskatchewan | 32 | 89 | 226 |
| Alberta | 2 | 7 | 401 |
| | 52 | 126 | 712 |

10,821 horses and 79 mules were inspected on being presented for shipment from the quarantined area in Alberta and Saskatchewan.

SHEEP SCAB.

Apart from a single outbreak in a remote part of Manitoba, and an isolated case in Quebec, Canada was free from sheep scab during the past year.

STATISTICS.

In Quebec, 27 sheep on two premises were quarantined, being suspected of sheep scab, distributed as follows:—

| District— | Quarantined. |
|--|--------------|
| Three Rivers and St. Maurice | 10 |
| Terrebonne | 17 |
| | — |
| | 27 |

In Manitoba, 62 animals on six premises in the district of Selkirk were found to be affected with sheep scab.

In accordance with the Quarantine Regulations, 67,891 sheep, imported into Canada for other purposes than immediate slaughter, were quarantined for the prescribed period of thirty days.

DOURINE.

Considerable progress has been made in dealing with this disease. The methods of diagnosis elaborated by Dr. A. Watson are being applied to the animals in quarantine, as suspects, with good results. Those found free from infection are released, and affected ones destroyed, resulting in a great reduction in the number quarantined. There is a good prospect that the disease will be entirely eradicated.

STATISTICS.

Eighteen animals, valued at \$3,145, were slaughtered as being affected with this disease, at a cost of \$2,096.66, distributed as follows:—

4 GEORGE V., A. 1914

SASKATCHEWAN.

| District— | Suspected and quarantined. | Slaughtered. |
|----------------------|----------------------------------|--------------|
| Assiniboia.. | 23 | .. |
| Battleford.. | 22 | 8 |
| Qu'Appelle.. | 3 | .. |
| | — | — |
| | 48 | 8 |

ALBERTA.

| District— | Suspected and quarantined. | Slaughtered. |
|------------------------|----------------------------------|--------------|
| Medicine Hat.. | 29 | 2 |
| Macleod.. | 113 | 8 |
| Victoria | 10 | .. |
| Red Deer.. | 7 | .. |
| Calgary.. | 1 | .. |
| | — | — |
| | 160 | 10 |

ANTHRAX.

A few outbreaks of this disease have been dealt with in the provinces of Quebec and Ontario, the rest of Canada being free from it. The policy of preventive vaccination with vaccine prepared at our laboratory has been followed with good results.

STATISTICS.

The following outbreaks were reported and dealt with during the year:—

| Province— | Outbreaks. | Animals quarantined. |
|----------------------------|------------|-------------------------|
| Quebec.. | 2 | 50 |
| Ontario.. | 1 | 69 |
| British Columbia.. | .. | 8 |
| | — | — |
| | 3 | 127 |

Four hundred and seven doses of Anthrax vaccine were sent out by the Biological Laboratory of the Branch.

BLACK QUARTER, OR 'BLACKLEG.'

Judging by the number of doses of Blackleg vaccine distributed from this office, this disease must be widespread in Canada, but as it is not dealt with under the Animal Contagious Diseases Act, there are no statistics regarding it.

Preventive inoculation with our vaccine has been followed by satisfactory results in the vast majority of cases.

Twelve thousand, four hundred and forty-eight doses of vaccine were sold to owners during the year.

RABIES.

Rabies has prevailed to a limited extent in Ontario and Alberta, the rest of Canada remaining free from infection. Prompt measures were taken to limit the disease to the localities where it was detected, and were crowned with success. We may, however, from time to time, expect fresh outbreaks of the disease. The long boundary between Canada and the United States, and the possibility that wild animals, such as coyotes and wolves, may become infected and carry the disease, render it unlikely that we can remain long without infection.

Unnecessary anxiety is sometimes caused by the ill-conditioned haste with which a suspicious dog is made away with. Dogs occasionally show symptoms which, to the inexperienced, give rise to the cry of 'mad dog,' when in reality it may only be suffering from an epileptic fit, or some other non-contagious malady. In suspicious cases, the dog should be securely chained and locked up in a room where no other animal can come near him. If he is really affected with rabies the distinctive symptoms will soon develop. If he is not, he will likely regain his normal condition in a short time. In every case where a dog is destroyed as rabid, the head should be cut off, packed in ice and sent by express to the Pathologist, Health of Animals Branch, Ottawa, and an accurate diagnosis will be made.

This procedure will enable persons who have been bitten by the animal to know whether it is necessary for them to take the Pasteur treatment or not.

STATISTICS.

In Ontario, 112 premises were quarantined on account of the prevalence of rabies in the adjacent districts, distributed as follows:—

| District— | Premises Quarantined. |
|-------------------|--------------------------|
| Essex.. . . . | 27 |
| Perth.. . . . | 2 |
| York | 27 |
| Welland.. . . . | 9 |
| Brant.. . . . | 7 |
| Huron.. . . . | 6 |
| Middlesex.. . . . | 4 |
| Oxford.. . . . | 13 |
| Kent.. . . . | 2 |
| Simcoe.. . . . | 1 |
| Elgin.. . . . | 12 |
| Lambton.. . . . | 2 |
| | <hr/> |
| | 112 |

In Alberta, 41 premises were quarantined on account of the prevalence of rabies in the adjacent districts, distributed as follows:—

| District— | Premises Quarantined. |
|----------------------|--------------------------|
| Edmonton.. . . . | 1 |
| Victoria | 32 |
| Medicine Hat.. . . . | 8 |
| | <hr/> |
| | 41 |

RED WATER.

The investigations begun some years ago by this Branch have been continued throughout the year by Dr. S. Hadwen, whose report will be found appended hereto.

SWAMP FEVER.

This disease continues to find victims among the horses of the west, especially in the three prairie provinces. Investigations have revealed the fact that the disease can be conveyed from one horse to another by inoculation with filtered blood. This shows that the causal agent is ultra-microscopic, so that there is little chance of detecting it unless some improvement in microscopes adds greatly to their power.

Experiments show that the disease, when communicated artificially, has a tendency to become milder with successive inoculations until it practically runs out. Natural infection shows no such tendency, and it is, therefore, supposed that some insect carrier is necessary to propagate the disease and preserve its virulence. This idea is further supported by the fact that the prevalence of the disease is greatest during the season of insect activity.

Work has been instituted at the Lethbridge laboratory, under the direction of Dr. A. Watson, with the object of ascertaining, if possible, what the insect carrier is, and also of finding some method for the rapid diagnosis of the disease.

CONTAGIOUS ABORTION.

Frequent inquiries from breeders for information from this department as to the nature, cause and treatment of this disease led me to issue a leaflet which gives a brief account of the present state of knowledge on the subject. It is, however, being very widely investigated at the present time, and new facts are coming to light which may considerably modify the views hitherto held. There is one thing certain, that the disease is very widespread and responsible for a very considerable loss to breeders.

Some investigation work was begun under my direction by Dr. T. C. Evans, of the Biological Laboratory, but has not progressed far enough to make a report at present.

Previous to my appointment, I had the opportunity of seeing what was being done in England with regard to the disease, and presented to you a special report on the subject, which is printed herewith.

BIOLOGICAL LABORATORIES.

The Biological Laboratory, Ottawa, under the charge of Dr. C. H. Higgins, has continued to furnish the tuberculin, mallein and other products necessary to the control of contagious diseases of animals, and, in addition, has been engaged in some research work. This latter has been somewhat limited, owing to the other duties of the staff and the inadequate facilities for more extended work. A synopsis of this will be found in Dr. Higgins' report.

The necessity for better facilities in connection with laboratory work in the west rendered it advisable to provide a better building for the purpose. A solid brick building was therefore erected on the quarantine grounds at Lethbridge, where Dr. A. Watson has been doing excellent work for some years. This has been well equipped with the necessary apparatus, and has already demonstrated its usefulness in enabling us to more promptly diagnose and eradicate dourine. It also provides facilities for the investigation of diseases of animals peculiar to the west, such as swamp fever, and should be of great value to the country.

SESSIONAL PAPER No. 15b

At Agassiz, B.C., a small laboratory is maintained in connection with the Experimental Farm. This is in charge of Dr. S. Hadwen, who has been chiefly engaged in the study of Red Water in cattle, but who has found time for other research work of value.

QUARANTINE STATIONS.

No additions have been made to the number of quarantine stations, but some necessary improvements have been made at stations where additional accommodation was urgently needed. Stables were erected at Coutts, Alberta, and at Windsor, Ont., and a piggery at Emerson, Man., the two latter of concrete construction.

The question of improving the quarantine station at Lévis, Que., has been taken up, and the recommendation of my predecessor carefully considered. It appears to be impossible to operate the present quarantine without having cattle and sheep driven to it along a public highway from the wharf where they are landed. This exposes them to chance contact with other animals, en route, and under certain circumstances would be dangerous to our live stock interests. I am, therefore, strongly of opinion that a new ground should be obtained with access to a railway by which the animals to be quarantined could be carried from the landing place.

IMPORT TESTING.

Twelve thousand one hundred and fifty-nine (12,159) horses were tested on arrival from the United States and allowed to proceed to their destinations.

| Entered at— | No. | Entered at— | No. |
|--------------------------------|-----|-------------------------------|------|
| Charlottetown, P.E.I.. | 1 | Toronto.. . . . | 2 |
| Halifax, N.S..... | 20 | Brockville.. . . . | 24 |
| Yarmouth.. . . . | 6 | Rainy River.. . . . | 14 |
| St. John, N.B.. . . . | 5 | Ottawa.. . . . | 1 |
| Woodstock.. . . . | 11 | Emerson, Man.. . . . | 1695 |
| Florenceville.. . . . | 6 | Snowflake.. . . . | 73 |
| Debec Junction.. . . . | 5 | Bannerman.. . . . | 117 |
| Grand Falls.. . . . | 8 | Gretna.. . . . | 564 |
| Aroostook Junction.. . . . | 20 | Winnipeg.. . . . | 11 |
| St. Stephen.. . . . | 12 | Wood Mountain, Sask.. . . . | 911 |
| McAdam Junction.. . . . | 26 | Willow Creek.. . . . | 1445 |
| St. Leonards.. . . . | 15 | Big Muddy.. . . . | 204 |
| Edmundston.. . . . | 24 | Weyburn.. . . . | 27 |
| Sherbrooke, Que.. . . . | 21 | North Portal.. . . . | 1907 |
| St. Armand.. . . . | 24 | Marienthal.. . . . | 248 |
| Montreal.. . . . | 1 | Swift Current.. . . . | 35 |
| St. Johns.. . . . | 10 | Maple Creek.. . . . | 4 |
| Comin's Mills.. . . . | 12 | Saskatchewan, general | 6 |
| Abercorn.. . . . | 11 | Coutts, Alta.. . . . | 914 |
| Beebe Junction.. . . . | 24 | Twin Lakes.. . . . | 521 |
| Sorel.. . . . | 1 | Pendant d'Oreille.. . . . | 75 |
| Lake Megantic.. . . . | 60 | Lethbridge.. . . . | 10 |
| Coaticooke.. . . . | 4 | Edmonton.. . . . | 1 |
| Beauceville.. . . . | 78 | Gateway, B.C... . . | 179 |
| Athelstan.. . . . | 28 | Grand Forks.. . . . | 198 |
| Dundee.. . . . | 7 | Huntingdon.. . . . | 219 |
| Lacolle Junction.. . . . | 37 | Vancouver.. . . . | 21 |
| Highwater.. . . . | 23 | Myncaster.. . . . | 74 |
| St. Agnes de Dundee.. . . . | 5 | New Westminster.. . . . | 2 |
| Noyan Junction.. . . . | 6 | Victoria.. . . . | 6 |
| Bridgeburg, Ont | 126 | Kingsgate.. . . . | 351 |
| Windsor.. . . . | 290 | Bridesville.. . . . | 117 |
| Port Arthur.. . . . | 3 | Rykerts.. . . . | 24 |
| Kingston.. . . . | 18 | Rossland.. . . . | 52 |
| Morrisburg | 13 | Midway.. . . . | 140 |
| Sarnia | 39 | Osoyoos.. . . . | 328 |
| Fort Frances.. . . . | 240 | Keremeos.. . . . | 118 |
| Sault Ste. Marie.. . . . | 21 | Nelson.. . . . | 48 |
| Prescott.. . . . | 45 | White Rock.. . . . | 86 |
| Cornwall | 23 | White Horse, Y.T. . . . | 1 |
| Niagara Falls.. . . . | 55 | | |

4 GEORGE V., A. 1914

IMPORT INSPECTIONS FROM UNITED STATES AND NEWFOUNDLAND.

| Port. | Horses. | Mules. | Cattle. | Sheep. | Swine. | Goats. | Asses. | Buffalo. |
|---------------------------|---------|--------|---------|--------|--------|--------|--------|----------|
| Charlottetown, P.E.I. | 4 | | | | | | | |
| Halifax, N.S. | 55 | 1 | | | | | | |
| Sydney, N.S. | 31 | | | | | | | |
| Yarmouth, N.S. | 17 | | 4 | | | | | |
| St. John, N.B. | 19 | | | | 8 | | | |
| St. Stephen, N.B. | 28 | | | | | | | |
| McAdam Jct., N.B. | 42 | 1 | 24 | | | | | |
| Debec Jct., N.B. | 11 | | 2 | | | | | |
| Woodstock, N.B. | 15 | | 1 | | | | | |
| Florenceville, N.B. | 8 | | 2 | | | | | |
| Aroostook Jct., N.B. | 47 | | 35 | | | | | |
| Grand Falls, N.B. | 8 | | | | | | | |
| St. Leonards, N.B. | 17 | 1 | | | 3 | | | |
| Edmundston, N.B. | 26 | | | | | | | |
| *Quebec, Que. | | | | | | | | 6 |
| Comins Mills, Que. | 16 | | 1 | | | | | |
| Lake Megantic, Que. | 60 | | | | | | | |
| Beauceville, Que. | 79 | | | | | | | |
| Coaticook, Que. | 4 | | | | | | | |
| Beebe Jct, Que. | 42 | | | | | | | |
| Sherbrooke, Que. | 67 | | 3 | 1 | 3 | | | |
| Highwater, Que. | 53 | | 2 | | | | | |
| Abercorn, Que. | 25 | 1 | 3 | | | | | |
| St. Armand, Que. | 42 | 1 | 40 | | | | | |
| Lacolle Jct., Que. | 231 | 3 | 3 | 7 | | | | |
| Noyan Junction, Que. | 32 | 2 | | | 2 | 1 | | |
| St. Johns, Que. | 3 | | | | | | | |
| Athelstan, Que. | 56 | | 3 | | | | | |
| Dundee, Que. | 30 | | 167 | | | | | |
| St. Agnes de Dundee, Que. | 15 | | | | | | | |
| Quebec General | 1 | | | | | | | |
| Cornwall, Ont. | 20 | | | | | | | |
| Prescott, Ont. | 630 | 1 | 28 | | | | | |
| Morrisburg, Ont. | 15 | | 8 | | | | | |
| Brockville, Ont. | 11 | | 25 | | | | | |
| Kingston, Ont. | 23 | | 6 | | | 1 | | |
| Cobourg, Ont. | 1 | | 1 | | | | | |
| Toronto, Ont. | 58 | 1 | | | | 1 | | |
| a Niagara Falls, Ont. | 394 | 21 | 53 | 33 | | 7 | | 2 |
| Bridgeburg, Ont. | 1,066 | 12 | 22 | 2,508 | 1 | | | 11 |
| Windsor, Ont. | 942 | 37 | 156 | 100 | 19 | 3 | | |
| Sarnia, Ont. | 318 | 1 | 82 | 1,582 | 3 | 4 | | |
| Sault Ste. Marie, Ont. | 45 | | 9 | 5 | | 7 | | |
| Port Arthur, Ont. | 3 | | 1 | | | | | |
| Rainy River, Ont. | 16 | | 12 | | | | | |
| Fort Frances, Ont. | 321 | 30 | 65 | 225 | 1 | 2 | | |
| Ontario General | 1 | | | | | | | |
| Emerson, Man. | 8,173 | 1,062 | 1,854 | 14,479 | 23 | 2 | | |
| Gretna, Man. | 2,113 | 234 | 291 | 9,930 | 1 | 1 | | |
| Snowflake, Man. | 89 | 2 | 49 | | | | | |
| Bannerman, Man. | 226 | 24 | 81 | | | 7 | | |
| Manitoba General | 11 | | | | | | | |
| North Portal, Sask. | 10,992 | 659 | 7,435 | 861 | 20 | 12 | 17 | 3 |
| Marienthal, Sask. | 482 | 20 | 104 | | | | | |
| Wood Mountain, Sask. | 1,290 | 15 | 86 | | | | | |
| Big Muddy, Sask. | 1,305 | 8 | 91 | 18,365 | | | | |
| Willow Creek, Sask. | 1,660 | 9 | 2,140 | 5,893 | | | | |
| Saskatchewan General | 76 | | | | | | | |
| Pendant d'Oreille, Alta. | 95 | 1 | 6 | 11,847 | | 6 | | |
| Coutts, Alta. | 2,080 | 45 | 344 | 85,586 | 6 | 4 | | |
| Twin Lakes, Alta. | 584 | 2 | | | | | | |
| Alberta General | 11 | | | | | | | |
| Gateway, B.C. | 802 | 37 | 12 | | | | | |
| Kingsgate, B.C. | 2,947 | 124 | 136 | 461 | 2 | | | 10 |
| Nelson, B.C. | 39 | | 7 | 825 | | | | |
| Rykerts, B.C. | 46 | 1 | | | | | | |
| Rossland, B.C. | 60 | 1 | 107 | 1,268 | | | | |
| Grand Forks, B.C. | 300 | 30 | 139 | | 1 | | | |
| Midway, B.C. | 197 | 6 | 11 | 4,561 | | | | |

SESSIONAL PAPER No. 15b

IMPORT INSPECTIONS FROM UNITED STATES AND NEWFOUNDLAND—*Con.*

| Port. | Horses. | Mules. | Cattle. | Sheep. | Swine. | Goats. | Asses. | Buffalo. |
|---------------------------|---------|--------|---------|---------|--------|--------|--------|----------|
| Myncaster, B.C..... | 80 | 1 | 34 | 808 | | | | |
| Bridesville, B.C..... | 121 | | | | | | | |
| Keremeos, B.C..... | 172 | | 10 | 466 | | | | |
| Osoyoos, B.C..... | 557 | 63 | 7 | | | | | |
| Huntingdon, B.C..... | 1,289 | 14 | 171 | 280 | 9 | 100 | | |
| New Westminster, B.C..... | 2 | | 2 | 20 | | 86 | | |
| White Rock, B.C..... | 1,239 | 53 | 113 | 26,296 | | 4 | | 3 |
| Vancouver, B.C..... | 657 | 34 | 11 | 32,015 | | 1 | | |
| Victoria, B.C..... | 374 | 9 | 10 | 5,573 | | | | |
| White Horse, Y.T..... | 137 | 4 | 786 | 120 | | | | |
| Total..... | 43,154 | 2,571 | 14,795 | 224,115 | 102 | 249 | 17 | 29 |

a 11 camels, 2 yak, 1 zebra, 1 deer, * 6 reindeer.

IMPORT INSPECTIONS FROM EUROPE AND ELSEWHERE.

| Port. | Horses. | Cattle. | Sheep. | Mules. | Swine. | Goats. |
|--------------------|---------|---------|--------|--------|--------|--------|
| Halifax..... | *1 | | | | | *2 |
| Sydney..... | | | | 1 | | |
| St. John..... | 411 | 1 | 31 | †2 | 29 | 4 |
| Quebec..... | 17 | 93 | 54 | | | |
| Sherbrooke..... | 12 | | | | | |
| Lacolle Jct..... | 10 | | | | | |
| Montreal..... | 1,730 | | | | | |
| Niagara Falls..... | 20 | 12 | | | | |
| Bridgeburg..... | 44 | | | | | |
| Total..... | 2,245 | 106 | 85 | 3 | 29 | 6 |

* From Bermuda. †1 mule from West Indies.

PURE BRED IMPORTS.

HORSES.

| Breed. | Great Britain. | United States. | Elsewhere. | Total. |
|----------------------|----------------|----------------|------------|--------|
| Belgian..... | 7 | 25 | 99 | 131 |
| Clydesdale..... | 1,201 | 6 | | 1,207 |
| French Coach..... | 2 | 8 | 1 | 11 |
| German Coach..... | | 1 | 1 | 2 |
| Hackney..... | 21 | 21 | | 42 |
| Percheron..... | | 145 | 190 | 335 |
| Pony..... | 534 | | | 534 |
| Shire..... | 72 | 13 | | 85 |
| Standard Bred..... | | 91 | | 91 |
| Suffolk..... | 21 | | | 21 |
| Shetland..... | 1 | 10 | | 11 |
| Thoroughbred..... | 13 | 8 | | 21 |
| Trottingbred..... | | 36 | | 36 |
| Yorkshire Coach..... | 1 | | | 1 |
| Total..... | 1,873 | 364 | 291 | 2,528 |

PURE BRED IMPORTS.—Continued.

CATTLE.

| Breed. | Great Britain. | United States. | Elsewhere. | Total. |
|-------------------|----------------|----------------|------------|--------|
| Polled Angus..... | 1 | | | 1 |
| Ayrshire..... | 77 | 6 | | 83 |
| Guernsey..... | | 4 | | 4 |
| Hereford..... | | 58 | | 58 |
| Holstein..... | | 66 | | 66 |
| Jersey..... | 14 | 33 | 12 | 59 |
| Red Polled..... | | 9 | | 9 |
| Shorthorn..... | 2 | 16 | | 18 |
| Brown Swiss..... | | 10 | | 10 |
| Total..... | 94 | 202 | 12 | 308 |

SHEEP.

| Breed. | Great Britain. | United States. | Total. |
|------------------|----------------|----------------|--------|
| Dorset..... | | 7 | 7 |
| Leicester..... | 12 | | 12 |
| Shropshire..... | 42 | 2 | 44 |
| Southdown..... | | 5 | 5 |
| Suffolk..... | 31 | 1 | 32 |
| Cheviot..... | | 41 | 41 |
| Rambouillet..... | | 2 | 2 |
| Total..... | 85 | 58 | 143 |

SWINE.

| Breed. | Great Britain. | United States. | Total. |
|--------------------|----------------|----------------|--------|
| Berkshire..... | 11 | 5 | 16 |
| Chester White..... | | 4 | 4 |
| Duroc Jersey..... | | 3 | 3 |
| Poland China..... | | 13 | 13 |
| Yorkshire..... | 18 | 1 | 19 |
| Total..... | 29 | 26 | 55 |

DISEASED IMPORTS—(GLANDERS).

| Port. | No. of Horses in Infected Shipment. | No. of Shipments. | No. of Horses Diseased. | Country of Origin. | Action. |
|----------------------------------|--|----------------------|-------------------------------|--------------------------|--------------------------------|
| St. Stephen, N.B. | 1 | 1 | 1 | U. States | Returned. |
| Woodstock, N.B. | 2 | 1 | 2 | " | " |
| Aroostook Jct., N.B. | 5 | 2 | 2 | " | " |
| St. Leonards, N.B. | 1 | 1 | 1 | " | " |
| Morrisburg, Ont. | 1 | 1 | 1 | " | " |
| * Emerson, Man. | 7 | 2 | 2 | " | " |
| Gretna, Man. | 26 | 4 | 4 | " | { 1 destroyed. 3 returned. |
| Snowflake, Man | 6 | 1 | 1 | " | Returned. |
| Bannerman, Man. | 22 | 5 | 5 | " | " |
| † North Portal, Sask. | 269 | 43 | 49 | " | " |
| ‡ Marienthal, Sask. | 73 | 9 | 13 | " | " |
| Wood Mountain, Sask. | 117 | 13 | 20 | " | { 4 destroyed. 16 returned. |
| Big Muddy, Sask. | 37 | 6 | 6 | " | Returned. |
| Sask. General. | 4 | 2 | 2 | " | 2 destroyed. |
| Pendant d'Oreille, Alta. | 4 | 1 | 4 | " | Returned. |
| Coutts, Alta. | 55 | 6 | 7 | " | { 6 destroyed. 1 returned. |
| Kingsgate, B.C. | 11 | 1 | 1 | " | Returned. |
| Rossland, B.C. | 2 | 1 | 1 | " | " |
| Grand Forks, B.C. | 4 | 2 | 2 | " | " |
| Myncaster, B.C. | 7 | 2 | 2 | " | " |
| Bridesville, B.C. | 1 | 1 | 1 | " | " |
| Osoyoos, B.C. | 5 | 2 | 3 | " | " |
| Huntingdon, B.C. | 15 | 4 | 6 | " | " |
| White Rock, B.C. | 15 | 3 | 5 | " | " |
| Vancouver, B.C. | 13 | 1 | 4 | " | " |
| Total | 703 | 115 | 145 | | |

* 23 horses rejected for mange. 1 cow rejected for tuberculosis.
† 1 cow rejected for tuberculosis.
‡ 2 horses rejected for mange.

ANIMALS INSPECTED FOR EXPORT.

| Port. | Horses. | Mules. | Cattle. | Sheep. | Swine. |
|---|---------|--------|---------|--------|--------|
| St. John to Great Britain | 2 | | | | |
| Montreal | 148 | | 6,107 | | |
| Toronto | | | 10,935 | | |
| Inspected at Montreal for shipment to Great Britain via Boston | | | 251 | | |
| St. John to South Africa | | 49 | 20 | | |
| Montreal | 23 | 222 | 61 | | |
| Halifax to Bermuda..... | 25 | | 20 | 46 | |
| " St. Pierre and Miquelon..... | | | 7 | | 13 |
| " Newfoundland..... | 3 | | | | |
| " Jamaica | | | 4 | | |
| " Antigua..... | 1 | | | | |
| " Trinidad..... | | | | 16 | |
| " South Africa..... | | | | | 3 |
| Sydney to St. Pierre and Miquelon | 2 | | 29 | 65 | 37 |
| Toronto to Bermuda | | | 96 | | |
| Montreal to France | | | 284 | | |
| Toronto to Belgium | | | 410 | | |
| " South Africa | | | 509 | | |
| Montreal to New Zealand..... | | | 10 | | |
| Charlottetown to Newfoundland..... | 25 | | 834 | 663 | 50 |
| Summerside | | | 179 | 235 | |
| Bayfield | 21 | | 159 | 28 | 1 |
| Mulgrave | 35 | | 741 | 395 | 7 |
| Sydney | 230 | | 921 | 946 | 320 |
| Halifax to United States | 3 | | | 1 | |
| Toronto | | | 2,125 | 341 | |
| Niagara Falls to Great Britain via United States..... | | | 408 | | |
| Inspected at Montreal for shipment to Italy via Boston..... | | | 17 | | |
| Toronto to France | | | 285 | | |
| Vancouver to New Zealand..... | | | 19 | | |
| Total | 518 | 271 | 24,431 | 2,736 | 431 |

EXPORT ANIMALS REJECTED AT THE FOLLOWING PORTS.

| Port. | Horses. | Mules. | Cattle. | Sheep. |
|----------------|---------|--------|---------|--------|
| Sydney | 2 | | 8 | 20 |
| St. John | | 1 | | |
| Montreal..... | | | 15 | |
| Toronto..... | | | 82 | |
| Total..... | 2 | 1 | 105 | 20 |

Of the above, 6 cattle at Montreal and 44 at Toronto, were rejected for Actinomyco-
mycosis. The rest of the animals were suffering from lameness or injuries received
during transportation, with the exception of the two horses which were affected with
influenza, and no contagious or infectious disease was found.

STAFF.

Several changes have taken place in the personnel of the staff, the increase of
work necessitating the appointment of additional inspectors, and the filling of places
rendered vacant by deaths and resignations.

SESSIONAL PAPER, No. 15b

Appointments.

Veterinary Inspectors—

T. Babe, V.S.
 H. L. Bissonnette, V.S.
 D. R. Bone, V.S.
 C. Brind, V.S.
 F. C. Brown, V.S.
 R. B. Coutts, V.S.
 H. W. Cowan, V.S.
 I. E. Croken, V.S.
 A. E. Dennis, V.S.
 P. A. Gough, V.S.
 A. E. Knapp, V.S.

Inspectors—

E. S. Clifford.
 G. Cousins.
 H. B. Currie.
 J. W. Dafoe.
 W. Dempster.
 A. Duck.
 G. English.
 W. Johnstone.

Clerk (outside)—

Miss M. R. Camsusa.

Veterinary Inspectors—

C. Maconachie, V.S.
 W. H. Marriott, V.S.
 G. C. McCoy, V.S.
 A. A. Moodie, V.S.
 W. Nicholls, V.S.
 J. Simpson, V.S.
 A. T. Sissons, B.V.Sc.
 R. T. Skelton, V.S.
 H. N. Thompson, V.S.
 C. E. Waddy, M.R.C.V.S.
 R. Waddy, M.R.C.V.S.

Inspectors—

J. King.
 F. C. Lawrence.
 S. H. McCulloch.
 S. Riendeau.
 N. Rothwell.
 B. A. St. John.
 W. Trevenue.
 H. M. Williams.

Transfers.

J. Dickinson, V.S. (to Meat Inspection).

Deaths.

G. W. Jemison, V.S.

A. Sparrow.

Resignations.

Veterinary Inspectors—

G. W. Bell, V.S.
 G. R. Brewster, V.S.
 J. Dickinson, V.S.
 A. Dufresne, V.S.
 J. B. Harrington, V.S.
 A. E. Knapp, V.S.
 D. H. McChesney, V.S.
 W. J. Moon, V.S.

Inspectors—

M. Ashbee.
 R. Blackwood.
 E. S. Clifford.
 H. B. Garlough.
 J. Ellis.

Veterinary Inspectors—

A. A. Kington.
 N. P. Olsen, V.S.
 R. T. Skelton, V.S.
 H. N. Thompson, V.S.
 R. Waddy, M.R.C.V.S.
 R. Riddell, V.S.

Inspectors—

F. C. Lawrence.
 D. Layland.
 J. McLean.
 J. B. Miller.
 T. Morgan.
 H. M. Williams.

Services Dispensed with.

Veterinary Inspectors—

H. S. McFatrige, V.S.

Inspectors—

T. H. Jones.

Inspectors—

J. E. Wilson.

MEAT INSPECTION.

This division, under the supervision of Dr. Robert Barnes, Chief Meat Inspector, whose report is published herewith, has been actively engaged in the inspection of all meat and meat products prepared in the establishments under inspection, as well as in the inspection of canning factories. A high standard of excellence has been aimed at, and it is gratifying to state that, almost without exception, the packers and canners have co-operated in the endeavour to attain this object.

The high price of meat in Canada has stimulated the trade in imported meats, both fresh and canned, which have come into our ports in larger quantities than ever before. Large quantities of mutton have been imported from New Zealand and Australia, and canned beef from the Argentine Republic and Uruguay. An inquiry is now under way to ascertain the extent and value of the inspection of these foods in the countries exporting them, and it may be necessary to amend our laws so that we may have a proper control over them to ensure their wholesomeness.

FRUIT, VEGETABLES AND CONDENSED MILK.

Constant supervision of the factories where these foods are canned has resulted in a steady improvement, not only in the buildings, but in the cleanliness and care with which these products are prepared.

There is still room for improvement, especially in the evaporating of apples, this work being done in so many small establishments that frequent inspection is difficult.

Appointments.

Veterinary Inspectors—

C. S. Anderson, V.S.
J. E. Bennett, D.V.S.
O. Brunet, V.S.
A. H. Carley, V.S.
F. A. Daigneault, M.V.
J. Dickinson, V.S.
W. R. Kincaid, V.S.

Lay Inspectors—

E. C. Church.
C. H. Johnston.
F. Maccabee.

Canning Inspectors—

F. W. Baumgartner (Milk.)
J. Breault (temporary.)
A. E. Calnan “

Clerk (outside)—

J. McCarthy.

Veterinary Inspectors—

W. D. MacCormack, V.S.
N. E. McEwen, B.V.Sc.
H. D. Nelson, B.V.Sc.
W. J. Pedden, V.S.
W. Tennant, V.S.
J. L. Trudeau, M.V.
G. Whitehead, B.V. Sc.

Lay Inspectors—

W. McCabe.
G. E. Walsh.
E. E. White.

Canning Inspectors—

F. W. Gray (temporary.)
H. St. J. Switzer.

Transfers.

T. Babe, V.S. (to Contagious Diseases Division.)
W. H. Marriott, V.S. “ “
D. R. Bone, V.S. “ “

SESSIONAL PAPER No. 15b

Deaths.

J. Edgecombe.

Resignations.

Veterinary Inspectors—

C. W. J. Haworth, V.S.

Veterinary Inspectors—

W. J. Moon, V.S.

Lay Inspector—

A. E. Calnan.

Prolonged Leave of Absence.

J. G. Hood, M.V.

H. D. Nelson, B.V. Sc.

R. E. Murray, V.S.

M. W. Everett.

J. N. Pringle, M.R.C.V.S.

Dismissals.

E. C. Church.

4 GEORGE V., A. 1914

ESTABLISHMENTS UNDER INSPECTION, MARCH 31st, 1913.

| No. | Name. | Place. | Inspectors. |
|-----|-----------------------------------|-------------------|---|
| 1 | Fowler's Canadian Co., Ltd..... | Hamilton..... | C. J. Johannes, V.S. W. A. Morrin, D.V.S. J. E. A. Duhamel, M.V. |
| 2B | Matthews-Laing, Limited..... | Brantford..... | W. Kime, V.S. J. G. Davidson, V.S. |
| 2C | Matthews-Laing, Limited..... | Peterborough..... | W. A. Henderson, V.S. Wm. Tennant, V.S. |
| 10 | F. W. Fearman Co., Ltd..... | Hamilton..... | A. C. Ramsay, V.S. W. R. Kincaid, V.S. H. Garrett, B.V.Sc. |
| 11 | Ingersoll Packing Co., Ltd..... | Ingersoll..... | R. D. Orr, V.S. C. L. Wallace, B.V.S. J. O. Guertin, M.V. |
| 13 | Whyte Packing Company, Ltd..... | Stratford..... | T. M. Pine, V.S. A. W. Beach, D.V.S. |
| 14 | Collingwood Packing Co..... | Collingwood..... | W. R. Bell, V.S. A. H. Carley, V.S. W. McCabe. |
| 17 | Jones Packing & Provision Co..... | Smiths Falls..... | J. B. White, V.S. |
| 31 | O'Keefe & Drew Abattoir Co..... | Chatham..... | J. R. Thompson, V.S. W. R. Monroe, V.S. |
| 2E | Matthews-Laing, Limited..... | Toronto..... | A. R. Torrie, V.S. T. H. Richards, V.S. R. H. Cook, V.S. G. C. Brownridge, V.S. D. Brown. |
| 4A | Wm. Davies Co., Ltd..... | Toronto..... | F. H. S. Lowrey, V.S. N. E. McEwen, B.V.S. A. A. Belanger, M.V. H. C. Leslie, V.S. W. J. Pedden, V.S. W. Howard. P. J. Kelly. W. J. Blainey. |
| 7 | Harris Abattoir Co..... | Toronto..... | A. C. Walker, B.V.S. D. A. Irvine, V.S. F. A. McNally, V.S. C. S. Cain, V.S. P. Kingston. E. E. White. |
| 9 | Gunns Limited..... | Toronto..... | D. C. Tennent, V.S. E. R. Farewell, V.S. T. W. R. Macfarlane, V.S. W. D. MacCormack, V.S. J. A. Hodgins. E. Hunter. |
| 18C | Swift Canadian Co., Ltd..... | Toronto..... | J. H. George, V.S. F. L. Wingate, V.S. W. Lawson, V.S. J. E. Morse, V.S. J. R. Songhurst. E. Cox. C. Brittain. |
| 28 | W. Wight & Co..... | ..... | J. E. Bennett, D.V.S. |
| 2A | Matthews-Laing, Limited..... | Hull..... | W. Moynihan, B.V.S. A. C. Tanner, B.V.S. J. Langevin, M.V. J. Terrence. |

SESSIONAL PAPER No. 15b

ESTABLISHMENTS UNDER INSPECTION. MARCH 31st, 1913—*Concluded.*

| No. | Name. | Place. | Inspectors. |
|-----|----------------------------------|------------------------|--|
| 2D | Matthews-Laing, Limited..... | Montreal | C. E. Edgett, V.S. (Acting). M. H. Milton, V.S. L. J. Demers, M.D., M.V. F. A. Daigneault, M.V. J. R. Young. D. McDonald. |
| 4B | Wm. Davies Co., Ltd. | Montreal | J. W. Symes, D.V.S. C. H. Weaver, B.V.S. J. N. L. Couture, M.V. O. Brunet, M.V. G. E. Walsh. F. Maccabee. |
| 22 | Montreal Union Abattoir | Montreal | E. G. Lemieux, M.V. F. A. Walsh, V.S. C. E. Derome, M.V. A. R. Monroe, V.S. S. Jaques, V.S. E. Dufresne, M.V. E. Beaudoin. |
| 24 | Win. Clark | Montreal | A. R. Douglas, D.V.S. E. Lallemant. |
| 25 | Montreal Abattoirs Limited. | Point St. Charles..... | W. H. James, V.S. C. D. Bancroft, D.V.S. R. D. Boast, V.S. J. F. Campeau, M.V. N. D. Reid, M.V. R. Benoit. |
| 29 | N. K. Fairbank Co., Ltd..... | Montreal | H. Mizener. |
| 47 | Société S.P.A..... | Montreal | H. Macey. |
| 18 | Swift Canadian Co., Ltd..... | Winnipeg..... | J. D. Ross, V.S. W. A. Hilliard, D.V.S. H. J. Elliott, M.D.V. |
| 19 | Gordon, Ironside & Fares | Winnipeg..... | F. C. Jones, V.S. G. L. Trudeau, M.V. G. Whitehead, B.V.S. |
| 20 | Gallagher, Holman & Lafrance.... | Winnipeg..... | A. R. Walsh, V.S. F. C. Bishop, M.D.V. H. Colebourn, V.S. C. H. Johnston. |
| 21 | Western Packing Co..... | Winnipeg..... | J. R. N. Harrison, V.S. R. B. Dellert, V.S. |
| 18B | Swift Canadian Co., Ltd | Edmonton..... | J. R. English, V.S. A. Hobbs, V.S. G. H. Tupling, B.V.S. |
| 23 | P. Burns & Co., Ltd..... | Calgary | I. Christian, V.S. H. Pomfret, V.S. T. G. McClelland. |
| 19B | Gordon, Ironside & Fares | Moosejaw | J. W. Purdy, V.S. S. G. Bright, B.V.S. |
| 50 | Davis & Fraser..... | Charlottetown..... | A. C. Lundie, V.S. |
| 23B | P. Burns & Co., Ltd..... | Vancouver..... | E. A. Bruce, V.S. C. S. Anderson, V.S. J. Dickinson, B.V.S. |

4 GEORGE V., A. 1914

THE FOLLOWING ESTABLISHMENTS HAVE BEEN UNDER INSPECTION TEMPORARILY BETWEEN APRIL 1st, 1912 AND MARCH 31st, 1913.

| No. | Name. | Place. | Inspectors. |
|-----|---|----------------------------|-------------------------|
| 12 | P. E. I. Railway..... | Kensington, P.E.I..... | |
| 34 | Sussex Packing Co | Sussex, N.B..... | |
| 35 | New Brunswick Cold Storage . . . | St. John..... | |
| 36 | W. A. Leard..... | Charlottetown | |
| 36B | W. A. Leard..... | Summerside, P.E.I..... | |
| 37 | Railway Freight Shed..... | York, P.E.I | |
| 38 | Railway Freight Shed. | Cape Traverse, P.E.I. | |
| 40 | Aylmer Canning Co..... | Aylmer, Ont | |
| 41 | P. E. I. Railway..... | Bradalbane, P.E.I..... | |
| 42 | P. E. I. Railway..... | Montague, P.E.I..... | |
| 43 | Steam Navigation Co..... | Charlottetown..... | |
| 46 | R. E. Mutch & Co..... | Charlottetown..... | |
| 48 | Heber Hartlen... .. | Halifax, N.S | |
| 51 | J. H. Myrick & Co.. .. | Tignish, P.E.I. | |
| 54 | Halifax Cold Storage | Halifax, N.S..... | |
| 56 | J. P. Tanton & Co..... | Summerside, P.E.I..... | |
| 57 | P. MacNutt & Son..... | Malpeque, P.E.I..... | |
| 58 | John R. Doucette | Waterford, P.E.I..... | |
| 60 | Fred. Magee..... | Port Elgin, N.B..... | |
| 61 | W. S. Fraser..... | Peter's Road, P.E.I..... | |
| 62 | J. A. Leaman & Co..... | Halifax, N.S..... | |
| 63 | Fred. Bennett..... | Stanley Bridge, P.E.I..... | |
| 64 | P. C. Gallant..... | Summerside, P.E.I..... | |
| 65 | Thos. Butler..... | Murray River, P.E.I..... | |
| 66 | John Munn..... | Murray River, P.E.I..... | |
| 67 | A. Bowles | Murray River, P.E.I..... | |
| 30 | Delhi Canning Co..... | Delhi, Ont..... | |
| | Chief, Meat Inspection Division..... | | R. Barnes, V.S. |
| | Travelling Inspector | | H. H. Ross, V.S. |
| | Chief Canning Inspector..... | | C. S. McGillivray. |
| | Canning Inspectors..... | | W. A. D. Graham. |
| | | | A. Bowlby. |
| | | | H. St. J. Switzer. |
| | Inspector of Condensed Milk Fac- tories | | F. W. Baumgartner. |
| | In charge of Toronto..... | | L. A. Willson, V.S. |
| | In charge of Montreal..... | | M. J. Kellam, V.S. |
| | In charge of Winnipeg..... | | C. D. McGilvray, M.D.V. |
| | In charge of Prince Edward Island. | | W. H. Pethick, V.S. |
| | Special duty in west (temporary)... | | F. Fisher, V.S. |

SESSIONAL PAPER No. 15b

DISEASES FOUND AT ESTABLISHMENTS UNDER INSPECTION.

| Diseases. | CATTLE. | | | SHEEP. | | | SWINE. | | | Poultry. |
|---------------------------|------------|------------|-----------|------------|------------|-------|------------|------------|--------|----------------------------|
| | Car-cases. | Por-tions. | Lbs. | Car-cases. | Por-tions. | Lbs. | Car-cases. | Por-tions. | Lbs. | Lbs. |
| Abscess. | 14 | 20,879 | | 54 | 331 | | 9 | 1,590 | | |
| Actinomycosis. | 12 | 8,370 | | | | | 1 | 364 | | |
| Adhesions. | | 2,574 | | | 252 | | | 2,632 | | |
| Atrophy. | | 57 | | | | | | | | |
| Angiomatosis. | | 982 | | | | | | | | |
| Bruises. | 137 | 14,738 | 10 | 39 | 573 | | 26 | 5,438 | 13,928 | |
| Cripples. | 3 | 87 | | 1 | 35 | | 3 | 4,843 | | |
| Cysts. | | 86 | | | 272 | | | 80 | | |
| Cysticercus Bovis. | 110 | | | | | | | | | |
| " Cellulosae. | | | | | | | 145 | | | |
| " Tenuicollis. | | | | | 35 | | | 18 | | |
| Congestion. | | 27 | | 3 | 1,429 | | 2 | 287 | | |
| Cirrhosis. | | 15 | | | 2 | | | 12 | | |
| Decomposed. | | | 2,050 | | | 1,218 | | | 2,314 | |
| Dirty. | | 25 | 53,252 | | | 535 | | 40 | 992 | |
| Emaciation. | 84 | | | 90 | | | 25 | | | |
| Enteritis. | 2 | | | 10 | | | 25 | | | |
| Emphysema. | | | | | | | | 538 | | |
| Hernia. | | 2 | | | | | 1 | 71 | | |
| Hydraemia. | 28 | | | | | | 1 | | | |
| Hydremic cachexia. | | | | 37 | | | | | | |
| Hypertrophy. | | 2 | | | | | | 2 | | |
| Hog cholera. | | | | | | | 25 | | | |
| Immaturity. | 884 | | | | | | | | | |
| Improper bleeding. .. | 10 | | | 15 | | | 33 | | | |
| Inflammation. | 2 | | | | | | 6 | | | |
| Icterus. | 4 | | | 7 | | | 11 | | | |
| Metritis. | 19 | | | 5 | | | 11 | | | |
| Mucoid degeneration. .. | 43 | | | | | | | | | |
| Mammitis. | 1 | 9 | | | | | 1 | 45 | | |
| Melanosis. | | 1 | | | | | | | | |
| Necrosis. | | 199 | | | 3,380 | | | 7,460 | | |
| Nephritis. | 16 | | | 3 | | | 7 | | | |
| Parturition. | 2 | | | 1 | | | | | | |
| Parasites. | 1 | 43,125 | | 1 | 78,816 | | 3 | 25,091 | | |
| Pericarditis. | 29 | 16 | | | | | 8 | | | |
| Peritonitis. | 25 | | | 4 | | | 62 | | | |
| Pleuritis. | 2 | | | 1 | | | 21 | | | |
| Pneumonia. | 98 | | | 36 | | | 153 | | | |
| Pyæmia or septicaemia. .. | 134 | | | 62 | | | 263 | | | |
| Sexual smell. | | | | | | | 51 | | | |
| Skin disease. | | 2 | | 1 | | | 1 | 87 | | |
| Sarcoma. | 3 | | | 1 | | | 7 | | | |
| Sour. | | | 133,197 | | | 6,197 | | | 78,290 | |
| Septic Infection. | 17 | | | | | | 4 | | | |
| Tuberculosis. | 2,080 | 16,691 | | | | | 2,155 | 382,184 | | |
| Tumours. | 2 | 11 | | | | | 3 | 10 | | |
| Uraemia. | 1 | | | 1 | | | 3 | | | |
| Various. | 17 | 49 | | 13 | 126 | | 27 | 392 | 31 | 1,464 |
| Damaged by fire. | | | 5,256,761 | | | | | | | 150,875 |
| Total. | 3,780 | 107,947 | 5,445,270 | 385 | 85,251 | 7,950 | 3,093 | 431,184 | 95,555 | 152,339 and 219 car. |
| Found dead. | 55 | | | 175 | | | 1,014 | | | |

4 GEORGE V., A. 1914

The following summary shows the results of post-mortem inspections of cattle, sheep and swine from April 1, 1912, to March 31, 1913:—

| | |
|--|-----------|
| Cattle marked 'Canada Approved' | 446,610 |
| Carcases of cattle 'Condemned' | 3,780 |
| Percentage of cattle 'Condemned' | .84 |
| Portions of cattle 'Condemned' | 107,947 |
| Sheep marked 'Canada Approved' | 455,262 |
| Carcases of sheep 'Condemned' | 385 |
| Percentage of sheep 'Condemned' | .08 |
| Portions of sheep 'Condemned' | 85,251 |
| Swine marked 'Canada Approved' | 1,604,648 |
| Carcases of swine 'Condemned' | 3,093 |
| Percentage of swine 'Condemned' | .19 |
| Portions of swine 'Condemned' | 431,184 |
| Total number of carcases 'Passed' | 2,506,520 |
| Total number of carcases 'Condemned' | 7,258 |
| Percentage of carcases 'Condemned' | .29 |
| Total number of portions 'Condemned' | 624,382 |

In addition to the animals slaughtered at inspected establishments, the following amounts of dressed and cured meats and lard, &c., were received during the fiscal year from the United States and Australasia:—

| | |
|--------------------|------------|
| | Pounds. |
| Beef..... | 326,871 |
| Mutton..... | 411,048 |
| Pork..... | 10,607,107 |
| Lard..... | 5,812,102 |
| Miscellaneous..... | 2,936,901 |

During the course of re-inspection, the following meats were condemned:—

| | Cattle. | Sheep. | Swine. | Poultry. |
|------------------------|-----------|--------|--------|----------|
| Sour..... Lbs. | 133,197 | 6,197 | 78,290 | |
| Dirty..... " | 53,252 | 535 | 992 | |
| Bruised..... " | 10 | | 13,928 | |
| Decomposed..... " | 2,050 | 1,218 | 2,314 | |
| Damaged by fire..... " | 5,256,761 | | | 150,875 |
| Various..... | | | 31 | 1,464 |
| | 5,445,270 | 7,950 | 95,555 | 152,339 |

Total amount condemned on re-inspection, 5,701,114 pounds.

PUBLICATIONS.

During the year the following bulletins were published:—

‘HOG CHOLERA’ BULLETIN (ILLUSTRATED).

This is a brief account of the disease, written in plain language for the use of farmers, and is intended to put them on their guard against this highly communicable disease, and to tell them what to do in case its presence is suspected. Our inspectors distribute these pamphlets among the farmers in the neighbourhood of an outbreak.

‘THE WARBLE FLY,’ BY DR. S. HADWEN.

A scientific report on an investigation into the life-history of the parasite and an inquiry into its economic importance in relation to the leather trade.

SESSIONAL PAPER No. 15b

'CONTAGIOUS ABORTION.'

A leaflet issued for the purpose of giving to farmers and stockmen, sound, useful information on the subject.

During the period since August 1, when I assumed office, I have endeavoured to keep in close touch with the various interests concerned with the department and have attended various meetings of veterinary associations, cattle breeders, dairymen and others, and have given addresses on bovine tuberculosis, &c. This has required my absence from my office for various periods when the work has been efficiently carried on by Dr. G. Hilton.

MEETINGS ATTENDED.

American Veterinary Medical Association, at Indianapolis, Ind.
Association of Live Stock Sanitary Boards, Chicago, Ill.
Eastern Dairymen's Convention, Kingston, Ont.
Dominion Cattle Breeders' Annual Meeting, Toronto, Ont.
Shorthorn Breeders' Annual Meeting, Toronto, Ont.
Manitoba Veterinary Association, Winnipeg, Man.
Saskatchewan Live Stock Convention, Regina, Sask.

I have the honour to be, sir,
Your obedient servant,

F. TORRANCE,

Veterinary Director General.

Honourable Martin Burrell,
Minister of Agriculture,
Ottawa.

APPENDIX No. 1.

(*G. Hilton, V.S., Chief Veterinary Inspector*).

OTTAWA, ONT., March 31, 1913.

The Veterinary Director General,
Ottawa, Ont.

SIR,—I beg to submit herewith my annual report for the year ending March 31, 1913.

The resignation of Dr. Rutherford, which took effect on March 31, 1912, necessitated my assuming charge of this branch until you took up active duty in this office in September.

During this period a few changes were made in the clerical staff. A stenographer was transferred at her own request to another branch, one clerk resigned and another was appointed. It was also necessary to engage, for temporary duty, a stenographer while some of the permanent staff were absent on statutory leave.

In the Outside Service five resignations were accepted, two veterinary field inspectors, one meat inspector and two car and yard inspectors. The branch also lost the services of a meat inspector and a car and yard inspector through death.

The annual examinations for veterinarians were held at the usual points throughout the country in the month of April, and a number of the successful candidates were appointed inspectors and assigned for duty where their services were most needed. Two additional lay inspectors were also appointed under the Meat and Canned Foods Act, and three canning inspectors were given temporary employment during the canning season.

In order to intelligently inspect the condensed milk factories, arrangements were made by Dr. Rutherford, while in office, to procure an expert from Switzerland, and when that gentleman arrived from that country in May he was duly appointed an inspector and commenced his duties immediately.

It was further necessary to engage three car inspectors to fill the vacancies caused through one death and two resignations.

Following our previous custom, inspectors have been transferred from one division to another whenever occasion demanded, and they have also been sent from province to province as the exigencies of the service required.

The maintenance of stock yards and cars in a sanitary condition is a highly important factor in the control and eradication of contagious diseases, and it was therefore found advisable to employ two travelling car and yard inspectors in the western provinces, the territory which was formerly covered by one man being divided into two districts. An inspector was then placed in charge of each district, with headquarters at Portage la Prairie and Calgary. This change has permitted the inspectors to pay closer attention to the numerous stock yards, and has also enabled these officers to supervise more effectively the work of the stationary car inspectors.

You will observe from the statistics that the officers of this branch in both divisions have been busily engaged in dealing with the many problems which have confronted them, and that there has been good cause for their activity.

Owing to difficulties arising in the province of Saskatchewan, it was found advisable on several occasions to detail for special duty in that province experienced officers from outside points.

Outbreaks of hog cholera were dealt with in Manitoba, Alberta, British Columbia, Ontario, and an isolated one in New Brunswick, the most serious occurring in the Thunder Bay district, western Ontario, and in the province of British Columbia.

SESSIONAL PAPER No. 15b

Fortunately, this disease has not been prevalent in Alberta and Manitoba, although prompt and thorough measures had to be taken on several occasions to prevent further losses from this cause. Most of these outbreaks have had their origin on premises where raw garbage had been fed, which points suspiciously to the garbage as the source of infection.

The outbreak in New Brunswick (the first one dealt with in Canadian hogs in that province) was very thoroughly investigated. The Chief Travelling Inspector personally supervised this work, and every effort was made to locate the source of infection. After most searching inquiry, all ordinary channels, through which infection is carried, were eliminated. It was found, however, that the feed had been changed from grain to hotel garbage, and that the outbreak followed a few weeks later. Fortunately, the infected premises were well isolated, and the disease, although of an exceedingly virulent type, was promptly stamped out without any extension of the outbreak.

Many other more serious outbreaks have been dealt with under similar circumstances, and it is quite apparent that until the hog raiser realizes the necessity of thoroughly cooking refuse of this sort, or, better still, of feeding more wholesome food stuffs, there will be a constant danger from this source. A campaign of education has consequently been followed by the inspectors, who have, as occasion presented, instructed owners carefully regarding the regulations and the financial risk involved in feeding this material.

There is no doubt that the forfeiture clause of the regulations will have a deterring effect if rigidly enforced, but, unfortunately, infection introduced into a district by this means is too frequently carried to other premises before active steps can be taken.

It is quite evident, in view of the slaughter and compensation policy of this branch, that suitable measures must be taken with individuals, who, after adequate warning, persist in feeding raw garbage.

The policy previously followed has been observed in regard to tuberculosis. A large number of export and import animals have been tested with tuberculin by the officers of this branch, while the cattle comprising the herds which have been placed under our supervision for the elimination of this disease have been given very careful attention, and have been submitted to tuberculin as often as circumstances warranted.

Although a few more herds have been added to the list, it is quite evident that cattle owners, as a whole, are not as yet anxious to officially ascertain the true condition of their herds in this respect. Many communications have been written to stockmen, giving full information regarding this malady, and the International Tuberculosis Commission pamphlet has been liberally and widely distributed. They have also been repeatedly and frequently advised that the department was anxious to assist them in every possible way to eradicate tuberculosis from their herds and maintain them free from this disease. Few, however, have taken advantage of this opportunity, which is more surprising when it is considered that no charge is made for this work, and that the department at present only insists upon the earmarking of reactors, and their prompt isolation from the healthy herd.

Tuberculin has been promptly forwarded, free of charge, to veterinarians upon receipt of requests from cattle owners; all reactors have been permanently earmarked by our officers, and full information and advice given the owners with reference to effective measures in dealing with affected herds.

While the individual stockman has not shown any great interest in this matter, municipal authorities are apparently commencing to realize the importance and necessity of providing for their people milk obtained from non-reacting tuberculin tested cattle. This has been evidenced by the fact that an increased number of applications have been received from them for tuberculin for this purpose. Even this

4 GEORGE V., A. 1914

rational and commendable action of the municipalities has met with opposition, but, fortunately, this has not in any way influenced those bodies. It will therefore appear that until the public demand milk and other food products only from non-tuberculous animals, the producers will not interest themselves to any great extent in the matter, unless they are compelled to do so by legislative measures.

Rabies fortunately has not been met with to any great extent; it has, however, caused some anxiety in Ontario, principally in urban districts, and, with the exception of a small outbreak in Alberta, has not been seen in any other part of the Dominion.

In Ontario, individual cases have continued to occur; these have been confirmed by microscopical examination of suitable specimens and by animal inoculation. It is very probable, in view of the regularity of their occurrence, that they originated from previous cases. When the peculiarities of this disease are considered, this is possible, in spite of the fact that a searching investigation is made in each case.

The origin of the Alberta outbreak was not definitely placed, but, in view of the existing conditions in that province, it is evident that an infected dog must have been introduced. Very strict measures were adopted in dealing with all exposed animals, and the outbreak was quickly controlled and duly suppressed.

Outbreaks of glanders have occurred persistently in Saskatchewan and Alberta; a few have been dealt with in Manitoba, while in Ontario only one case has been detected. This disease also existed to a limited extent in New Brunswick and Quebec, each case being eventually traced to the outbreak of the previous year in the former province, but it was not possible to accurately determine the origin of each one in Quebec. The affected animals had changed owners frequently, and were in nearly every instance finally traced to the logging camps. All possible contacts were located and effectively dealt with. In view, however, of the impracticability of isolating all these cases under the existing conditions in the bush, all reasonable measures were taken to ascertain the condition of the horses in the camps. It will, however, be necessary to give special attention to these animals as opportunity offers.

The situation in Saskatchewan, after many years of energetic, concentrated action, is assuming a much more favourable aspect, and while the statistics do not show a marked decrease in the number of horses destroyed, the many clinical cases formerly met with are now less frequently seen.

The horse owners in this province, due largely to past experience, are now taking a keen interest in this work and are commencing to isolate suspected cases and report them promptly to the department. The many difficulties experienced by our officers in the past, due to the prejudice and suspicion of horse owners, are now gradually disappearing. Practical observation of mallein testing and its satisfactory results have gained for the department the confidence of the horse owners, so much so that opposition is now seldom met with.

This province has been practically covered, and there are few, if any, districts in it where investigations have not been made. It is therefore reasonable to assume that, with the hearty co-operation of the horse owners, and the strict enforcement of the policy of this branch, cases of glanders will be rarely met with in the near future.

In Alberta, the outbreaks have been more numerous than in previous years. This is probably due, partly to the fact that it has been possible to give more attention to this particular work, and to the marked advancement of agricultural pursuits. The force in Alberta has in previous years been so busily engaged in controlling cattle mange on the range that the investigation of glanders has been limited to reported cases. As, however, these did not indicate that the disease was at all prevalent, there was, in view of the circumstances, no justification for further action.

It is generally recognized that horses bred and reared on the range, with their well known tendency to keep together in their own particular bunches, are less liable to spread infection than horses bred and reared in a more domestic state under faulty sanitary conditions; and also that this disease does not so frequently become

SESSIONAL PAPER No. 15b

acute in the former animals as in the latter. The rapid changes which have taken place in recent years through the agricultural development of this province, are doubtless largely responsible for the dissemination of this disease, and there is also evidence to show that the construction camps play an important part in its distribution.

The increased demand for horses, with their increased values, the advent of the settler, and the curtailing of ranching, have resulted in the marketing of all available saleable stock. In view of these facts it is not surprising to find an increase in the outbreaks of this malady in this province. By the concentration of energetic action, however, there is every prospect of obtaining the same satisfactory results in the near future which have followed the enforcement of the policy of this branch in the other provinces.

There has been a decrease in the number of cases of dourine in the provinces of Alberta and Saskatchewan, and although several reported outbreaks have been investigated in other provinces, no cases have been discovered in any other part of the Dominion.

The work of the officers specially entrusted to deal with this malady has been of a very high order, and excellent progress has been made.

The extremely insidious nature of this malady has necessitated exercising the utmost caution, and consequently many valuable breeding animals have been held in quarantine for long periods, resulting in heavy losses to their owners. It is, however, gratifying to find that by exercising tact and good judgment, the inspectors have been able to enforce stringent regulations with very little irritation.

The progress which has been made is largely due to Dr. Watson's excellent work in serum diagnosis, conducted under trying and difficult circumstances. The untiring efforts of the inspectors to forward him numerous samples of serum in suitable condition taken from suspected animals is also worthy of mention. This method of diagnosis has proven very accurate in locating dormant cases, and has enabled the inspectors to deal with them with much more promptness and despatch than was formerly possible. Much time has therefore been saved, and the inconvenience and annoyance necessarily caused by holding suspects under observation for long periods has been removed. Many suspected districts have been satisfactorily dealt with, and there is every reason to expect the most sanguine results during the coming year.

Horse mange fortunately is not prevalent and has only been found in the provinces of Quebec, Saskatchewan and Alberta. In the latter province, only a few cases have been detected, while in Quebec and Saskatchewan the outbreaks have been limited and less frequent than during the previous year.

More or less difficulty is always experienced in dealing with this malady, and the recurrence of the disease on premises previously dealt with is not uncommon. It has therefore been found necessary to supervise the treatment of the animals and the disinfection of all contact matter. This disease is now under good control, and any outbreaks which may arise can be promptly dealt with.

Cattle mange still exists in Alberta and Saskatchewan, and the infected territory in the Kamloops district in British Columbia is rapidly assuming a normal aspect, so much so that it is very probable the restrictions can be safely removed in the near future.

A number of cattle owners strongly objected to treating their herds, and at times a great deal of irritation resulted. This was due to the fact that the quarantined limits extended into localities where the disease was not definitely determined, an essential procedure in quarantining big tracts of land. The rough nature of the country made it impracticable to closely define the infected area, and consequently it was necessary to take advantage of natural boundaries, which no doubt included many farms on which the disease did not exist. This, however, cannot be avoided even on the open

4 GEORGE V., A. 1914

prairies; and as it was desired to prevent undue hardships, special steps were taken to include the least possible margin of uninfected territory as far as safety would permit.

With this end in view the situation was very carefully considered by Dr. Tolmie, the Chief Inspector in the province, who personally visited the area on many occasions, and familiarized himself with the actual conditions in the territory involved. Later events have clearly shown that this officer exercised good judgment in recommending its boundaries, as it has not been necessary to increase the area, the disease having been controlled without infecting new territory. Great credit is due him, and the officers working under his direction, for the faithful and capable performance of their duties under very adverse circumstances.

The eradication of this malady in this area has been a difficult problem, especially so when it is considered that the cattle owners were unfamiliar with the disease and with the necessary methods for its control. Vats had to be constructed at the owners' expense, and special instructions had to be given to ensure that they were suitably erected. The mountainous and woody nature of the country made it frequently impossible to gather cattle for dipping purposes; this resulted in frequent delays. When this was accomplished, great difficulty was experienced in keeping the cattle isolated during the required intervals between the first and second dippings.

In view of these conditions it is only natural that opposition was at times encountered, and a special effort was made to deal justly with these people, the majority of whom doubtless appreciate the fact that the action of the inspectors was prompted only by the very best motives.

In Saskatchewan, there has been a marked decrease in the number of cases, while in Alberta good progress has been made. Dr. Hargrave, with the assistance of his capable staff, has continued to direct the operations in the area in both these provinces in a very satisfactory and able manner. There are now many localities in this territory which are free from this disease, but in view of the open country it has not been considered safe to curtail the boundaries of this area. A special effort is, however, being made to warrant such action, and directly this is possible more rapid progress will be made. Sufficient range riders have been employed throughout the year to keep in as close touch as practicable with the cattle in this territory, and any suspected cases, and their contacts, have been promptly quarantined for official treatment as soon as weather conditions permitted. This procedure has been very much more popular with the owners than the older policy of compulsory treatment of all cattle in the area, and has lessened irritation very materially.

The effective treatment of these animals is attended by many difficulties, which can only be adequately appreciated by those familiar with range conditions. It is, therefore, gratifying to find that the majority of the stockmen are alive to the situation, and are assisting our officers in their honest endeavours to eradicate this disease.

The staff of veterinary inspectors, whose duty is limited to the inspection of stock shipments, has been considerably increased, and as these officers are located at all the principal shipping points, no unnecessary delay should be experienced by the shipper in obtaining their services. A few complaints have been received in this connection, but upon investigation it has been shown that the shipper was to blame, as he had neglected to give reasonable notice of his intention to ship.

Only one suspected case of sheep scab has been discovered throughout the Dominion during this period. This case was detected on premises where the disease had been dealt with last year in the province of Quebec. Everything possible has been done in the way of tracing up and subjecting to treatment all sheep known or suspected to have been in contact with this animal, but no further cases have been discovered.

SESSIONAL PAPER No. 15b

Two small outbreaks of anthrax have been investigated in old infected districts, one in the province of Quebec, the other in Ontario. Only a few animals succumbed; their carcasses, with all contaminated matter, were carefully burned under official supervision, and vaccination of exposed stock advised.

The owners of infected farms, and those of adjacent ones, fully appreciate the security obtained by this protective measure, as they procure the vaccine manufactured at the Biological Laboratory at regular intervals.

More serious losses from this dreaded highly malignant disease have no doubt been prevented by the constant intelligent immunization of animals in infected localities.

Black-quarter is not officially dealt with under the provisions of the Animal Contagious Diseases Act, but a protective vaccine is manufactured in cord form at our Biological Laboratory, which is supplied to stockmen at cost price throughout the Dominion. In order to facilitate prompt delivery, a fresh supply of this vaccine is kept constantly on hand at Victoria, Vancouver, Kamloops, Medicine Hat, Regina and Winnipeg, and the eastern provinces are supplied direct from headquarters. Judging from the sale of this vaccine, the disease is well distributed throughout the country, but as vaccination is constantly practised in districts where it has previously occurred, it is not possible to form a safe opinion regarding the number and extent of actual outbreaks.

A very virulent type of this malady is, however, known to occur in British Columbia, which apparently requires the preparation of a vaccine from the special strain of organism accountable for these exceedingly acute cases. Arrangements have therefore been made to obtain suitable material for this purpose, and directly this is received by the Pathologist here, steps will be taken to manufacture a product that will adequately immunize the young stock exposed to this form of infection.

The Biological Laboratory staff have been busily engaged in the manufacture of mallein and tuberculin, the preparation of anthrax and blackleg vaccines, and the examination of the numerous specimens received for diagnostic purposes. Experiments have also been conducted with a view to increasing our knowledge regarding black-head in turkeys, a disease which has caused very serious losses in certain districts, and in some localities has made it almost impossible to raise these birds.

The examination of specimens, forwarded by the Meat Inspectors, has also increased the work of this staff. It was found advisable to engage a stenographer early in the year, as much valuable time was taken up in writing reports. This officer's services are, however, also utilized in many other ways, enabling Dr. Higgins, the officer in charge, to devote his attention more fully to the work of the laboratory than was formerly possible.

Important researches have been made at the Research Laboratory at Lethbridge by Dr. Watson, and at Agassiz by Dr. Hadwen. This work has been of inestimable value to the branch, and will doubtless prove of still greater value as better facilities are provided.

A modern building has recently been completed at Lethbridge, where it was very much needed, owing to the exhaustive work of Dr. Watson in the elaboration of serological methods of diagnosis for dourine, previously referred to. In addition to this work, which has received preference, owing to the existence of dourine in Saskatchewan and Alberta, investigations have been made of loco-disease, swamp fever, glanders, contagious abortion in mares, coital exanthema, and hog cholera. Microscopic examinations of specimens forwarded for diagnosis have also received attention.

Dr. Hadwen's work has, owing to the peculiarities of the province in which he is working, been conducted on different lines. His attention has been chiefly directed to investigation and research into suspected piroplasmic infections. Experiments

4 GEORGE V.; A. 1914

have been conducted, as far as practicable with the available facilities, in a very capable manner. A special effort has been made to ascertain facts regarding the history, life cycles and peculiarities of ticks, necessitating careful persistent search for these well-known obligatory parasites. They have been collected and identified, and sufficient progress has been made to definitely determine that 'red water' in cattle in British Columbia is not of piroplasmic origin.

Some valuable work has also been done on the biology of the warble fly, and a bulletin on this subject published for distribution, upon your direction.

Many other matters have received attention, obscure cases in the field have been investigated, and specimens examined for diagnostic purposes.

The variety and number of problems requiring the services of a trained veterinary pathologist, which have frequently arisen, show very conclusively the wisdom of establishing a laboratory at Agassiz, B.C. It is very probable that it may be necessary to increase the facilities for this work in the near future.

The United States have taken the greatest number of our export cattle. There has been a marked decrease in the exportations to Great Britain, an increased number have been shipped to South Africa, and a limited number to New Zealand. There have also been two consignments exported to France, one to Holland and another to Italy. A few have been shipped to Bermuda and a considerable number to Newfoundland. The inspection of the majority of these animals has been made by the officers specially entrusted with this work at Montreal, Toronto, Niagara Falls, Bridgeburg, St. John, Sydney and Halifax.

Close attention has been given to the inspection of railway cars and yards, and a special effort made to maintain them in a good sanitary state.

The travelling car and yard inspectors have practically inspected all the yards in the Dominion, and the officers stationed at the points designated by Ministerial Order 37, report that the majority of the incoming cars are found in a satisfactory condition. The railway companies are giving them every assistance in the performance of their duties.

The enforcement of this order has automatically resulted in these cars receiving constant attention, and has improved this service very materially.

The Hochelaga stock yards, which have been in use for many years, have been closed recently by the company, and the trade transferred to the East End cattle market. The facilities at the latter point are adequate and modern. Extensive improvements have been made by the Union Stock Yards Co., in Toronto, new sheds have been erected, the yards largely increased and supplied with the most modern equipment. The excellent conditions existing in these yards have very largely increased the trade at this point. The West End cattle market is limiting its accommodation by the erection of a municipal abattoir on its premises.

Improvements have been made in nearly all the important stock yards throughout the country, those at Fort William and North Bay deserving special mention.

A small stock yard has recently been built at Muskoka, which permits the railway company to observe the 28-hour unloading law in east or west-bound stock. The improvement in the condition of these large yards is largely due to Inspector Cooke's persistent attention.

Two quarantine stables have been erected during this period, one at Windsor, Ont., the other at Coutts, Alta., and a suitable site has been obtained at Niagara Falls on which to build, when this is considered necessary.

Upon advice being received from Great Britain, in the latter part of June, that foot and mouth disease had again broken out in that country, special protective measures were promptly enforced. The permits which had been issued for importations of ruminants and swine were cancelled, with the exception of those for shipments actually en route. The importation of hay, straw, fodder, feed stuffs or litter accompanying horses from the British Isles, as well as from the continent, was

SESSIONAL PAPER No. 15c

absolutely prohibited. The inspectors stationed at the Atlantic seaports were fully alive to the dangers of the situation and exercised the greatest vigilance in the performance of their duties, with very satisfactory results.

Since your arrival here my duties have been confined to the office, with the exception of a short visit to Charlottetown in the month of September.

I have the honour to be, sir,

Your obedient servant,

GEORGE HILTON.

Chief Veterinary Inspector.

4 GEORGE V., A. 1914

APPENDIX No. 2.

(R. Barnes, V.S., Chief, Meat Inspection Division.)

OTTAWA, March 31, 1913.

The Veterinary Director General,
Ottawa.

SIR,—I have the honour to submit my annual report for the year ending March 31, 1913.

From the beginning of the year to the time of your acceptance of the position of Veterinary Director General, my duties were confined principally to the office. It was deemed advisable, however, for me to make a few short trips to points in Ontario and Quebec, not altogether for the purpose of adjusting any differences which had arisen between our officers and the managements of establishments under inspection, but rather to investigate and come personally in touch with actual conditions in order that they might be better understood and dealt with in a manner which would be fair and just to the different interests concerned.

Early in April, the annual examinations were conducted by members of the staff at different points throughout the Dominion, where fifty-one candidates presented themselves, of whom forty-five were successful in obtaining the number of marks required to become eligible for appointment as inspectors under the Meat and Canned Foods Act. The percentage of those successful is much larger than in previous years. This is in no way due to any particular difference in the questions set for the examination, but rather to the advance in the method of teaching veterinary medicine and surgery in our colleges. This is especially noticeable in connection with the subject of meat inspection, the lecturer on this branch of education in the Ontario Veterinary College being an inspector of this division.

During the year, the staff was increased by seventeen veterinary inspectors and four lay inspectors. These additions were necessitated on account of transfers to the Diseases Division, resignations, dismissals and a gradual strengthening of the staff in order that the work might be more effectively carried on without an undue strain on the inspectors who, in the past, have been called on to perform an excessive amount of work. This, if continued, physically unfits them and is more or less certain to check their energy and enthusiasm without which their work, owing to the nature of the duties and the environment during its performance, would soon tend to become of a perfunctory nature.

While the total number of animals slaughtered under inspection, 2,513,778, shows a slight decrease as compared with the previous year, the condemnation for disease more particularly for tuberculosis, is on the increase.

Cattle and calves slaughtered show an increase of 10 per cent, due to the continued high prices and the wholesale slaughter of calves. This is to be regretted, since, with our already short supply of beef animals, the killing of so many calves (which at best furnish only a poor meat food) will further deplete the supply in years to come. In compiling statistics in connection with calf slaughter, some interesting facts are revealed. In Montreal, for a period of three months during the calf season, the ratio of calves killed as compared with beef cattle was one and one-fifth to one; in Toronto, one calf to seven cattle; in Winnipeg, one to seventeen cattle.

Economists, agriculturists and live stock men have been engaged for some time endeavouring to evolve some means whereby the supply of meat-food animals may be increased in order that even our home consumption may be met, but up to the

SESSIONAL PAPER No. 15b

present no definite feasible plan has been presented. Both legislation and education along this line have been suggested, yet it would appear that the producers will necessarily require to be shown that the production of meat-food animals will return a reasonably fair, and a surer profit than is obtained through other channels of agriculture and live stock enterprise.

Sheep killings show an increase of 79,210, or twenty-one per cent over the previous year. While this may be due to an increased production, it must not be forgotten that prices for this class of animal were fairly attractive and may have had the effect of bringing to the markets many animals which would otherwise have remained in the breeding flocks of the country. The slaughter in the different provinces was as follows:—

| | | |
|------------------------------|----|--------------------|
| Ontario.. | 6 | per cent decrease. |
| Quebec.. | 23 | “ increase. |
| Maritime Provinces.. | 62 | “ “ |
| Manitoba.. | 46 | “ “ |
| Western Provinces.. | 44 | “ “ |

The increased slaughter in Western Canada was in some measure due to the importation, for immediate slaughter, of large numbers of animals from the western and middle states.

Hog killings show a decrease of thirteen per cent. This is confined to Eastern Canada. Manitoba and the west show an increase of, approximately, forty-five per cent, which will no doubt continue and show still greater gains, as the necessity for mixed farming is becoming more apparent.

The possibilities of Western Canada in the production of meat-food animals can scarcely be over-estimated. Its acres of finest natural grasses and the enormous quantities of cheap grains, if utilized in the growing and finishing of cattle, sheep and hogs, would undoubtedly be a source of considerable revenue to the agriculturist, and at the same time be a means whereby our rapidly increasing population might obtain a supply of home-grown meat foods.

The canning of poultry in Canada, fostered by the Meat and Canned Foods Act, has grown during the last four years by leaps and bounds. This trade has now become well established, more particularly in Ontario and the Maritime Provinces.

Our exports of meat and meat products for the year total 45,114,367 pounds, being almost 30,000,000 pounds less than the previous year.

The imports into inspected establishments show a large increase:—

| | | |
|-------------------------|-----|-----------|
| Beef.. | 300 | per cent. |
| Mutton.. | 100 | “ |
| Pork.. | 50 | “ |
| Lard.. | 100 | “ |
| Miscellaneous.. | 100 | “ |

The Customs returns state that there were imported into Canada during the year, 49,347,961 pounds of meat and meat foods. These amounts, when set against our exports, show that during the past fiscal year Canada did not produce a sufficient amount of meat foods for home consumption. To the imports might also be added the importation of 229,000 head of sheep for immediate slaughter. While this is an unfortunate condition, it does not follow that the consumption of meat foods will continue to exceed production. The tremendous increase in our population, the great majority of whom are settling on farms in the west, will in a few years undoubtedly become producers, when we will again take our place as exporters of large quantities of meats and meat-food products. In the meantime, however, it would appear that the present scarcity and prevalent high prices will continue.

4 GEORGE V., A. 1914

Judging from the returns forwarded by our inspectors, the condemnations for different causes are greater than those of the previous year.

The necessity for a rigid inspection of meat-food animals is apparent when, in establishments under inspection, there were condemned as diseased and unfit for human food, 7,258 carcasses and 624,382 portions; yet the number slaughtered in these establishments represents only about fifty per cent of the total kill in the Dominion. The animals brought to inspected plants are selected and apparently healthy, the managements knowing well that to slaughter an animal affected with disease means its condemnation and loss, yet, in spite of the care exercised by their buyers, diseases found on postmortem were responsible for the destruction of the number of carcasses and portions above mentioned.

The conditions surrounding the slaughter, and the healthfulness of the meat obtained from the other fifty per cent of animals, slaughtered without inspection or supervision of any kind, may be imagined when it comprises animals refused by packers as suspicious, as well as those showing unmistakable ante-mortem evidences of disease, together with its quota of those, the healthfulness of which can only be decided by a careful postmortem examination conducted by a qualified and trained veterinary meat inspector.

It is to be regretted that Boards of Health have been so long neglectful of this matter, although there are no doubt many difficulties to overcome in establishing a proper system of local and municipal meat inspection. It must come, however, but until municipal bodies bestir themselves, so long will a great percentage of the meat-eating people be served with unclean and unsound meat foods which cannot be other than a menace to health.

I am glad to know that it is your intention shortly to put into operation a measure for the control and possible eradication of tuberculosis. The loss due to this disease is enormous. It is known that of the carcasses which are condemned, fifty-five per cent of the cattle and seventy per cent of the hogs are destroyed for this cause, while of the condemned portions twenty per cent from cattle and ninety per cent from hogs are affected with this disease.

The condemnations for pneumonia comprised 98 cattle, 36 sheep and 153 hogs. These occurred principally during the hot weather. In many cases this is due to careless and improper handling, more particularly in the case of swine, where they are crowded into wagons and cars and drenched with cold water. I am convinced that by the exercise of reasonable care this could be prevented to a very large extent, and the waste of a large quantity of valuable meat food thus be obviated.

Condemnation for parasitic infection is considerable, principally due to *Cysticerci* (tape worm), 137 cattle and 145 hogs being destroyed for this cause during the last twelve months. It is worthy of note that nearly all the carcasses affected with this parasite come from the prairie provinces. This may, to a great extent, be attributed to the habit of the Indians and early settlers of eating meat in a partially cooked or even raw condition, and to the lack of sanitary conveniences, the rains washing the segments of the mature worm on to the pastures where they are eaten by the cattle and hogs, thus completing its natural cycle. The advance in the mode of living, together with inspection, will no doubt in time lessen to a very great extent, if not totally eliminate, this cause of loss.

I wish to draw your attention to the losses due to bruises, cripples and animals found dead. There does not appear to me to be sufficient care exercised in the transportation of animals, as in many cases the cars are overcrowded to such an extent as to cause the death of dozens of prime animals. This overcrowding is possibly due to an attempt on the part of the shipper to reduce freight charges per head, but the bruising and crippling of animals cannot be attributed to that cause. The lack of judgment on the part of train crews, and the abuse of live stock in the loading and unloading of cars should be given serious consideration.

SESSIONAL PAPER No. 15b

During the year, some disastrous fires occurred in establishments under inspection. The plant of the Tillsonburg Packing Company was entirely destroyed, and has not, up to the present, been rebuilt. The West End plant of the Montreal Abattoirs, Limited, suffered considerable loss, 135,886 pounds of meat being destroyed. Repairs to the building were made immediately, and operations continued as usual. The establishment of P. Burns & Co., at Calgary, was almost wiped out, the only parts left being the killing floors. Owing to the complete destruction of the cold storage, some 5,120,875 pounds of meat and 150,875 pounds of poultry were either completely destroyed or rendered unfit for food purposes. Temporary cold storage buildings were erected, and in a remarkably short time the business, even under this severe handicap, assumed its normal volume. A modern packing plant is now in course of construction.

In January last, by your permission, I spent some time at the packing houses in Chicago for the purpose of studying inspection as carried on by the United States officers. Through the kindness and courtesy of Dr. Bennett and his assistant, Dr. Seigmond, I was enabled to get in close touch with their work and to familiarize myself with its details. While there is little difference between the actual inspection for diseased conditions as carried on by the Bureau officers and that of our inspectors, I found that, owing to the magnitude of some of the plants and the apparently large expenditure of money in their construction, satisfactory sanitary conditions are more easily maintained than in the majority of our Canadian establishments. I may say, however, that the plants in this country will compare very favourably with those in the United States of similar size and date of building. Without going into further details, much valuable information was obtained during my trip, which, when applied as far as practicable, will tend to improve our service.

Your officers have, with but few exceptions, given loyal support during the past year, and have performed faithfully their many and arduous duties. Some minor differences have arisen between inspectors and managements of establishments, all of which have been amicably adjusted.

The work of Travelling Inspector Ross, whose duties are necessarily many and varied, has been performed in a manner creditable to himself and to the branch.

CANNED FRUITS, VEGETABLES AND CONDENSED MILK.

The inspection of factories engaged in this trade has been carried on in a very satisfactory manner.

Owing to the development of the canning industry and the erection of a large number of new factories, the staff of permanent inspectors were unable to properly supervise the work. It therefore became necessary to recommend that additional help be obtained, and the Minister, after full consideration, authorized the employment of three temporary inspectors, their services being utilized for a period of six months during the busy season. The wisdom of these appointments is apparent by the work performed.

The sanitary conditions of the factories engaged in preparing this class of food were, with a single exception, well maintained. In that particular case it became necessary to threaten somewhat harsh measures, which had the desired effect.

The pack was rather light, and comparatively high prices were obtained. These conditions do not tend to improvement in the product, as it increases the tendency to the use of an inferior quality of raw material. In order that this practice may not continue until it checks the demand for these wholesome and convenient foods, I am of the opinion that it will soon become necessary to establish standards of quality in order that the purchaser may be reasonably sure by the label as to the quality of the contents of the can.

4 GEORGE V., A. 1914

A special inspector for condensed milk factories was engaged and, judging from his reports, this trade is in a flourishing condition and is carried on under modern sanitary requirements.

While there is considerable improvement shown in connection with the manufacture of evaporated apples, the conditions under which this product is manufactured are, with a few exceptions, unsatisfactory. This branch, through its officers, has been endeavouring to educate the proprietors of these factories to produce a better product under sanitary conditions, and although some progress has been made, there remains much to be accomplished.

The work of the different inspectors engaged in this work has been satisfactory, and the Chief Inspector, Mr. C. S. McGillivray, by his energy and good judgment, rendered valuable service during the year.

I have the honour to be, sir,

Your obedient servant,

ROBT. BARNES,
Chief, Meat Inspection Division.

APPENDIX No. 3.

(A. E. Moore, D.V.S., Chief Travelling Inspector).

OTTAWA, March 31, 1913.

The Veterinary Director General,
Ottawa.

SIR,—I have the honour to submit to you my annual report for the year ending March 31, 1913.

From April 13 to July 2 I was engaged continually in this office, taking Dr. Hilton's work during the time that he was Acting Veterinary Director-General. From this date until your appointment as Veterinary Director-General, I was also engaged in the office when my outside duties were not urgent.

On July 2 I left Ottawa for Saskatchewan arriving at Regina on the 5th inst. The purpose of my visit was to familiarize myself with the work being done in the province, more especially with reference to glanders. In discussing the subject with Inspector Tamblyn some important changes in the mode of dealing with glanders were made, which greatly simplified the work and enabled the inspectors to attend more promptly to urgent cases. Other matters pertaining to the provincial work were also settled.

I also visited other parts of the province and personally interviewed many of the inspectors at their work, after which I left for Ottawa and arrived on July 20.

From time to time during the year I have visited nearly all the inspection ports and quarantine stations in Eastern Canada for the purpose of interviewing and instructing the different officers with reference to their duties.

GLANDERS.

The total number of horses destroyed for glanders in the eastern provinces this year was thirty-four, an increase of four over last year. In every case, however, they were found in districts where glanders had been dealt with in previous years, and originated, no doubt, from some incipient cases which were not then discovered. Owing to the insidious nature of the disease, and the utter impossibility of always being able to trace all the contact cases, it is almost too much to hope that we will not occasionally find isolated outbreaks from these old infected districts where the disease has been prevalent for years. However, I am satisfied that by persistent efforts we will in time entirely stamp out this dreaded malady.

The following is a synopsis of horses destroyed in the eastern provinces this year:—

| | |
|--|-----------|
| Ontario, 7 horses destroyed; compensation.. . . . | \$ 700 00 |
| Quebec, 17 horses destroyed; compensation.. . . . | 1,595 00 |
| New Brunswick, 10 horses destroyed; compensation.. . . | 866 65 |

I have personally tested with mallein eleven suspected horses on six different premises, five of these reacted. These diseased horses were all contacts, being part of the New Brunswick outbreak over which I had personal supervision. I also examined clinically other reported cases which were found to be suffering from either nasal gleet, heaves or diseased teeth.

4 GEORGE V., A. 1914

TUBERCULOSIS.

I have tested, on nine different premises, 401 cattle, fifteen of which reacted. These cattle are under the special supervision of this branch.

I also tested six cattle for export to South Africa, all of which proved healthy.

Four reacting cattle were earmarked by me; these cattle were tested by local veterinarians supplied with tuberculin from this branch.

HOG CHOLERA.

This troublesome disease has again caused quite heavy losses during the past year. The two most serious outbreaks, in Eastern Canada, occurred in the counties of Essex and Kent. The Essex outbreak originated first in garbage-fed hogs and later it was suspected that infection might also have come from Michigan, as the disease was very prevalent in that state this year.

The Kent outbreak traces directly from an imported sow from the State of Ohio. Although this sow was kept in quarantine for the usual period, she was without doubt a chronic case and in this way a carrier of the infection. She was accompanied by a small pig which died on its arrival at the quarantine. At that time the sow was very unthrifty looking, but gained in flesh and was considered quite healthy when released. Soon after she arrived at her destination in Kent county she gave birth to a litter of pigs, all of which eventually died of hog cholera; following this, the other hogs on the farm took sick and most of them were dead by the time the inspector was notified. From this place the disease spread from farm to farm until it covered quite a large area and was very virulent in character. This outbreak was finally stamped out through the persistent efforts of Inspector Rowe.

I visited these infected districts on two different occasions and remained through the month of November until we got the outbreak pretty well under control. In the outbreaks, Inspectors Perdue, Rowe and Jones did good work.

In October, Inspector Frink, of St. John, New Brunswick reported suspected hog cholera at a farm near St. John, and requested that I go down to make an examination. On investigation I found the disease to be hog cholera. This was the first outbreak ever reported in the province of New Brunswick. The infection was traced to garbage-fed hogs. Fortunately, there were no contacts, and no further cases have since developed.

I investigated several reports of suspected hog cholera in different parts of the country, but found the conditions due to digestive derangements.

SHEEP SCAB.

No positive cases of scabies in sheep were seen by me this year. One flock near Montreal, however, was quarantined on suspicion and will be officially dipped as a precautionary measure. Two flocks were also quarantined by Inspector Vigneau, near Three Rivers; none of them were positive cases.

MANGE IN HORSES.

Quite an extensive outbreak of mange in horses was discovered during the latter part of the winter, in the southern part of Carleton county. These cases are now being dealt with in the usual manner, under my direction.

SESSIONAL PAPER No. 15b

RABIES.

During my stay at Windsor in November I investigated several cases of rabies in dogs, which were properly dealt with in accordance with the regulations.

INSPECTING IMPORT HORSES.

During the year I tested fourteen horses imported from the United States. They were entered on six different dates.

DIPPING EXPORT SHEEP.

I have supervised, during the year, the dipping of twenty-nine sheep intended for export to the United States.

I have the honour to be, sir,

Your obedient servant,

A. E. MOORE,

Chief Travelling Inspector.

APPENDIX No. 4.

(C. D. McGilvray, M.D.V., Inspector in Charge of Manitoba).

WINNIPEG, MAN., March 31, 1913.

The Veterinary Director General,
Ottawa.

SIR,—I have the honour to submit herewith report for the year ending March 31, 1913, in connection with the Health of Animals Branch for the province of Manitoba.

During this period the services of your officers have been fully occupied in consistently carrying out the various requirements of the Animal Contagious Diseases Act, and the regulations made thereunder, relating to quarantine and the control of disease, as well also as the Meat and Canned Foods Act and the regulations relating thereto.

The operations of the branch here may therefore be conveniently considered under these three divisions, viz:—

Diseases of Animals Control Division.

Animal Quarantine Division.

Meat Inspection Division.

DISEASES OF ANIMALS CONTROL DIVISION.

The work in connection with this Division has obviously consisted chiefly in dealing with the control and eradication of such diseases as are scheduled under the Contagious Diseases of Animals Act, together with the enforcement of the various regulations and Ministerial Orders relating thereto. Investigations have also been made from time to time of such other diseases and conditions affecting animals, as appeared to be deserving of attention and consideration.

The diseases dealt with under this division by the officers of this branch were glanders, hog cholera, mange of horses, mange of cattle, sheep scab, suspected dourine, tuberculosis and black leg.

GLANDERS.

The control and eradication of this disease is, I am pleased to state, still being marked by steady progress and satisfactory results. A decrease in the number of outbreaks and animals affected and destroyed, over the preceding year, is noticeable.

SESSIONAL PAPER No. 15b

Glanders Statistics for Manitoba.

SUMMARY showing total number of horses and mules tested and destroyed during the year, by the various inspectors here:—

| | |
|--|-------|
| Horses and mules submitted to test— | |
| First test.. | 663 |
| Second test.. | 196 |
| Third test.. | 8 |
| Fourth test.. | 1 |
| Horses and mules destroyed for glanders— | |
| First test.. | 13 |
| Second test.. | 8 |
| Third test.. | None. |
| Fourth test.. | 1 |
| | |
| Total destroyed.. | 22 |

Of this number one was a clinical case.
Total compensation allowed, \$2,030, being an average of \$92.27 per animal.

| | |
|---|-----|
| Import horses tested at destination— | |
| First test.. | 317 |
| Second test.. | 12 |
| Destroyed for glanders without compensation.. | 2 |

| | |
|--|----|
| Export horses to the United States tested— | |
| First test.. | 13 |

All of which proved negative to the test.

HOG CHOLERA.

This serious affection of swine has manifested itself during the past year in certain parts of the province of Manitoba, as well as in the western part of Ontario, particularly in the districts tributary to Rainy River and Fort Frances.

The investigations of your officers indicate that the feeding of uncooked kitchen refuse and garbage, containing pork or pork products, is responsible for the occurrence of the disease in urban and suburban districts. In fact the occurrence of hog cholera in urban and suburban districts and the non-appearance of the disease in the rural districts, has shown a striking connection between such outbreaks and the feeding of swine upon uncooked kitchen refuse and garbage, obtained from hotels and restaurants, and containing portions of pork and pork products of imported origin, and points strongly to such material being a medium conveying infection and starting fresh outbreaks, the inference being that such meats and products had been prepared from infected hogs.

HOG CHOLERA STATISTICS FOR MANITOBA.

| | |
|--|------------|
| Number of premises inspected.. | 175 |
| “ swine inspected.. | 2,574 |
| “ premises quarantined.. | 31 |
| “ “ on which the disease was found to exist. | 15 |
| “ diseased and contact animals destroyed.. . . . | 249 |
| “ animals destroyed for post-mortem examination. | 6 |
| Total compensation allowed.. | \$1,711.32 |

In connection with the outbreaks in the districts of Rainy River, Fort Frances and Kenora, in western Ontario, dealt with by officers of this branch, the following number of animals and premises were dealt with:—

| | |
|--|----------|
| Number of premises inspected.. . . . | 160 |
| “ swine inspected.. . . . | 916 |
| “ premises quarantined.. . . . | 35 |
| “ “ on which the disease was found to exist. | 17 |
| “ diseased and contact animals destroyed.. . . . | 128 |
| Total compensation allowed.. . . . | \$741.99 |

All of the premises inspected were re-visited at intervals covering a period of three months, and special attention was directed towards having the premises upon which diseased animals had been kept cleansed and disinfected in a satisfactory manner.

MANGE OF HORSES.

This disease has only been found to a slight extent during the past year. The affected and contact animals were placed under quarantine and satisfactorily treated under the supervision of an inspector, with the mange preparation recommended by the department, and the thorough cleansing and disinfection of the premises strictly enforced.

| | |
|--|----|
| Total number of horses inspected for mange.. . . . | 58 |
| “ “ affected and contact animals quarantined for treatment.. . . . | 42 |

MANGE OF CATTLE.

This disease was not found affecting cattle originating in Manitoba, but was detected among cattle inspected at the stockyards at Winnipeg, coming from the mange-infected area in the province of Alberta.

In accordance with the requirements of the mange regulations, all cattle originating west of Winnipeg are unloaded and inspected at Winnipeg, and cattle destined for points east of Winnipeg are only allowed to proceed after being carefully inspected and accompanied by an inspector's health certificate. During the past year, a considerable number of cattle have also been shipped from Winnipeg to points in the western provinces of Alberta and British Columbia. These cattle were dealt with in a similar manner to those going to eastern points, and were only permitted to go forward after having been duly inspected, and accompanied by an inspector's health certificate. Cattle showing manifestations of mange are not allowed to go forward, but are detained here and are allowed to be removed from the yards under an inspector's certificate for immediate slaughter only.

During the past year the following number of cattle were inspected at the Winnipeg stockyards:—

| | |
|---|--------|
| Destined to points east of Winnipeg.. . . . | 7,415 |
| “ “ west “ | 3,015 |
| For local consumption at Winnipeg.. . . . | 71,340 |
| Total cattle inspected.. . . . | 81,770 |

Of this number, 75 were found to be affected with mange.

SHEEP SCAB.

In accordance with the requirements of Ministerial Order No. 40, we inspected for scab, 40,714 sheep imported from the United States intended for immediate slaughter.

Scab was found affecting several small flocks of sheep adjacent to the city of Winnipeg, the origin of which was traced to contact with sheep imported from the United States. The affected and contact animals were placed under strict quarantine and dipped twice under the supervision of an inspector, in the lime and sulphur dip approved by the department. The premises were likewise thoroughly cleansed and disinfected under the supervision of an inspector.

DOURINE.

TUBERCULOSIS.

BLACK-LEG.

INSPECTION OF LIVE STOCK CARS AND YARDS.

151-4

The stockyards at Winnipeg, and elsewhere throughout the province, have also been inspected at regular intervals by Inspector St. John, Inspector of Live Stock Cars and Yards, and were cleansed and disinfected, from time to time, as appeared necessary. This periodical inspection of stockyards throughout the province has had a marked effect and brought about a great improvement in the condition of the stockyards throughout the province.

ANIMAL QUARANTINE DIVISION.

The work of this division has consisted in the enforcement and carrying out of the requirements of the regulations relating to Animal Quarantine.

The animal quarantine stations and inspection ports in Manitoba are located at Emerson, Gretna, Bannerman and Snowflake.

EMERSON QUARANTINE STATIONS.

This station is located at Emerson on the international boundary line at the point where the Canadian Northern and Canadian Pacific lines of railway and their American connections intersect. The officer in charge at this point is Inspector B. A. Bescoby. Besides the inspector in charge, a caretaker is also maintained at this point, whose services are made use of in assisting the inspector and in keeping the yards and stables in good repair and cleanly condition.

The yards and stables are cleansed and disinfected with limewash and carbolic acid from time to time as required.

The equipment and accommodation at this point consists of a fenced enclosure 205 feet in length by 100 feet wide. There is stable accommodation for 100 head of horses and cattle and a covered-in shed. The stable is well lighted and ventilated.

There was also erected during the past year a building, or piggery, for the detention of pigs while undergoing the required period of quarantine. The dimensions of this building are 32 feet by 16 feet, and the construction is of concrete throughout, so that it can be easily cleansed and disinfected.

A quantity of gravel was also placed in the yards during the past year, to ensure the ground being in a dry condition.

During the past year there has been presented for entry and inspection the following number of animals:—

| | |
|------------------------|------------|
| Horses.. . . . | 8,173 |
| Mules.. . . . | 1,062 |
| Cattle.. . . . | 1,854 |
| Sheep | 14,479 |
| Goats.. . . . | 2 |
| Swine | 23 |
| Fees collected.. . . . | \$2,020.16 |

GREटना QUARANTINE STATION.

This station is located at Gretna on the international boundary line, and is conveniently situated between the Canadian Pacific railway and the Midland branch of the Great Northern railway, each of which lines has a branch spur running to the quarantine station.

The officer in charge at this station is Inspector J. A. Stevenson. Besides the inspector in charge there is maintained a caretaker, whose services are made use of in a capacity similar to that of the caretaker at Emerson.

The equipment at this station consists of a substantially fenced enclosure 140 feet in length by 120 feet wide; stable, 100 feet by 30 feet, providing accommodation for forty-five animals, which is well lighted and ventilated.

SESSIONAL PAPER No. 15b

The yards and stable are kept in a good state of repair and are thoroughly cleansed and disinfected with limewash and carbolic acid, from time to time, as required.

During the past year there has been presented for entry and inspection the following number of animals:—

| | |
|------------------------|----------|
| Horses.. . . . | 2,113 |
| Mules.. . . . | 234 |
| Cattle.. . . . | 291 |
| Sheep.. . . . | 9,930 |
| Goats | 1 |
| Swine.. . . . | 1 |
| Fees collected.. . . . | \$830.81 |

BANNERMAN QUARANTINE STATION.

This station is situated on the B.S. & H.B. branch of the Great Northern railway at Bannerman, which is distant from the international boundary line about 3½ miles.

The inspector in charge at this station is Inspector F. J. Braund. The equipment consists of a fenced enclosure, 140 feet in length by 120 feet wide; stable, 100 feet by 30 feet, providing accommodation for about forty-five animals. The stable is well lighted and well ventilated.

During the past year, office accommodation has been provided for the inspector in charge at this point.

There has been presented for entry and inspection, during the past year, the following number of animals:—

| | |
|------------------------|---------|
| Horses | 226 |
| Mules.. . . . | 24 |
| Cattle.. . . . | 81 |
| Sheep.. . . . | Nil. |
| Goats.. . . . | 7 |
| Swine.. . . . | Nil. |
| Fees collected.. . . . | \$65.77 |

SNOWFLAKE INSPECTION PORT.

Snowflake, which is an inspection port only, is located on the Snowflake branch of the Canadian Pacific railway, distant about three miles from the international boundary line. The department has a stable rented at this point, which provides accommodation for about twenty-five animals, and, up to the present, this has been sufficient for requirements.

The officer in charge at this port is Inspector J. C. Bonnett. During the past year there has been presented for entry and inspection the following number of animals:—

| | |
|-------------------------|--------|
| Horses.. . . . | 89 |
| Mules.. . . . | 2 |
| Cattle | 49 |
| Sheep.. . . . | Nil. |
| Goats.. . . . | Nil. |
| Swine | Nil. |
| Fees collected | \$5.00 |

There were also inspected at Winnipeg, by Inspector Little, eleven horses which had been smuggled into Canada and seized by the Customs officials. These horses were submitted to the mallein test, and fees amounting to \$8.25 collected thereon.

Summary showing total number of animals presented for entry and inspection, and submitted to the mallein and tuberculin tests at the various ports of entry in Manitoba:—

| | |
|--|------------|
| Horses and mules inspected.. . . . | 11,934 |
| “ “ submitted to a first mallein test . . . | 2,146 |
| “ “ “ “ second mallein test.. | 42 |
| “ “ which reacted and were refused entry.. | 11 |
| Cattle inspected.. . . . | 2,275 |
| “ submitted to the tuberculin test.. . . . | 24 |
| “ which reacted to the test and were refused entry.. | 1 |
| Sheep inspected.. . . . | 24,409 |
| Goats “ | 10 |
| Swine “ | 24 |
| Fees collected | \$2,929.99 |

EXAMINATION OF THOROUGHBRED STALLIONS.

During the past year, we have, on instructions received from you, made an examination for soundness of the following thoroughbred stallions standing for service in the province:—

‘Vance Guard,’ No. 166, the property of the Canadian National Bureau of Breeding, in charge of R. C. Cochran, Oak River, Man.

‘Ruby Bird,’ No. 52977, the property of Jas. Dillon, Brandon.

‘Kid,’ No. 315, the property of the Canadian National Bureau of Breeding, in charge of H. Flett, Binscarth.

‘Crawford,’ No. 355, the property of the Canadian National Bureau of Breeding, in charge of Thos. Morris & Sons, Rosewood.

‘Loricata,’ No. 284, the property of the Canadian National Bureau of Breeding, in charge of Mr. Walter Scott, Elphinstone.

‘Brown Tony,’ No. 403, the property of the Canadian National Bureau of Breeding, in charge of George Ferguson, Cartwright.

‘Oraculum,’ No. 137, the property of the Canadian National Bureau of Breeding, in charge of Baron de la Rue du Cann, St. Rose du Lac.

‘Stage Pirate,’ No. 457, the property of the Canadian National Bureau of Breeding, in charge of W. D. Staples, Treherne.

‘Lafe,’ No. 488, the property of Wm. Berry, Shellmouth.

‘Goddard,’ No. 522, the property of F. H. H. Lowe, Ninette.

MEAT INSPECTION DIVISION.

The work in connection with this division has consisted in the carrying out of the various requirements of the Meat and Canned Foods Act, and the regulations relating thereto.

There are coming within the operations of the Act, and under inspection, at Winnipeg, four establishments, viz:--

The Swift Canadian Co., Ltd., known as Establishment No. 18.

Messrs. Gordon, Ironsides & Fares, known as Establishment No. 19.

Messrs. Gallagher, Holman & LaFrance, known as Establishment No. 20.

The Western Packing Co., known as Establishment No. 21.

SESSIONAL PAPER No. 15b

At each of these establishments a sufficient number of veterinary inspectors has been maintained to carry out the actual work of technical inspection of all animals both before and after slaughter. During the past year a staff of twelve veterinary inspectors and three lay inspectors have been actively engaged in the carrying out of this work.

A close supervision is also exercised over the further preparation of meat and meat-food products, and the proper labelling thereof.

All of which is respectfully submitted.

I have the honour to be, sir,

Your obedient servant,

C. D. MCGILVRAY,

Inspector.

APPENDIX No. 5.

(D. S. Tamblyn, D.V.S., Inspector in Charge of Saskatchewan).

REGINA, March 31, 1913.

The Veterinary Director General,
Ottawa.

SIR,—I have the honour to submit herewith my annual report for the fiscal year ending March 31, 1913, for the province of Saskatchewan.

The work performed by the officers of the Health of Animals Branch of the Department of Agriculture, is as follows:—

GLANDERS.

I am pleased to state that our work in connection with this disease during the past year has been encouraging to a great extent. The decrease in the number of animals tested and those destroyed over the preceding year, is, as you will note, most marked, and from the present situation it appears to me that this malady will continue to keep decreasing, as I firmly believe that we now have this insidious disease under control, which condition is due to the arduous work of the officers under my supervision. Such conditions as above stated, will not only be appreciated by this department, but by all those interested in the live stock industry.

Serious outbreaks of glanders made their appearance in the districts of Strassburg, Govan and Rouleau. I personally made several trips into these districts for the purpose of supervising the work with the view of bringing the testing to an early conclusion. From all reports, I feel satisfied that this disease does not now exist to any great extent in any of the districts above mentioned.

The total number of animals submitted to mallein throughout the province is as follows:—

| | |
|-----------------|--------|
| Horses | 10,478 |
| Mules | 187 |
| Asses | 2 |

Out of the above, the following animals were tested at the different boundary ports:—

| | Horses. | Mules. | Asses. |
|------------------------|---------|--------|--------|
| North Portal | 1,652 | 77 | 2 |
| Big Muddy | 204 | 2 | .. |
| Marienthal | 240 | 16 | .. |
| Willow Creek | 1,441 | 7 | .. |
| Wood Mountain | 915 | 3 | .. |

Five hundred and thirteen (513) of the total number of animals tested, reacted, and were dealt with as follows:—

| | |
|------------------------|--------------------------------------|
| North Portal.. . . . | 49 rejected and returned to U. S. A. |
| Big Muddy.. . . . | 6 " " " |
| Marienthal | 13 " " " |
| Wood Mountain | 20 " " " |

Four hundred and twenty-six (426) native horses were destroyed; 362, 1st test; 54, 2nd test; 7, 3rd test; 3 on inspection.

SESSIONAL PAPER No. 15b

One hundred and forty-one (141) of the total number of animals destroyed exhibited clinical symptoms.

Total value of horses destroyed, \$61,605.

Total compensation for horses destroyed, \$40,950.

Two (2) horses, valued at \$180, were destroyed without compensation.

HOG CHOLERA.

In connection with hog cholera, I would say that the officers of this branch dealt with a number of outbreaks in the districts of Regina, Saskatoon, Rosthern, Moosejaw, Keeler, Brownlee, Elbow, Tuxford, Marquis and Strassburg.

| | |
|--|-------------|
| Total number of swine inspected.. | 7,564 |
| Total number of diseased and contact swine destroyed.. | 1,416 |
| Valuation.. | \$12,711.55 |
| Compensation.. | 8,476.33 |

I have come to the conclusion that, generally speaking, the average farmer fails to grasp the importance of sanitation in the raising of hogs. As a rule, the hog is given the filthiest outhouse for cover, which I may state is seldom cleaned. Apart from the surroundings being detestable, this animal's food is taken from barrels that are never washed, reeking with abomination, and which often contain swill of the most putrid kind. In short, it will be noted that the hog is condemned to become a scavenger for the hotel, kitchen and slaughter house. This animal seems to be given whatever is considered unfit for human food, instead of being fed fresh, sound and wholesome food, and housed in buildings containing dry, warm bedding, with plenty of light, pure air and few hogs to the pen. These last-mentioned points have appealed to me during the past year as being most essential from a preventive point of view. Prevention, so to speak, is the great cure in this particular malady. The policy employed in the eradication of this disease in the Dominion, is, I firmly believe, a wise one, as the control of hog cholera by serum immunization is, from the experience of other countries, not a very profitable one, neither is it a sound argument, especially when it has been proven that the immune hog will transmit the disease to non-immune animals, and likewise the immune hog will transmit the disease to its offspring. Therefore, under the present system employed in the Dominion, i. e., the destruction of all diseased and contact animals, marked success has shown itself. I can safely say that it was only through such drastic measures that hog cholera was prevented from spreading to a much greater extent, as from all reports, while the disease is not entirely eradicated, it is confined to very few districts. The existing conditions, therefore, as far as this disease is concerned in this province, may be said to be very satisfactory. However, hog cholera is not to be entirely eradicated if we wait for the owners to report that such a disease has broken out among their hogs. I am of the opinion that tri-monthly inspection of swine in infected districts, under certain precautions, should be instituted, as well as the withholding of compensation in cases of neglect to report, and systematically training the farmer in the raising and caring of swine.

I would also point out that from my observation the so-called immune hog is a source of danger to the swine raiser in any particular vicinity, and therefore I would suggest as a preventive measure, the prohibiting of such animals from entering Canada from the United States, and thus cut off the source of infection through this particular channel.

A thorough disinfection of infected premises has been strictly enforced wherever hog cholera existed in this province during the past year. I may state that I personally dealt with a number of serious outbreaks of this disease during the fiscal year just past.

HORSE MANGE.

Horse mange appears to be well under control, and while no serious outbreaks have occurred, the officers of this branch were from time to time called upon to deal with a few isolated cases. The following will show the amount of work performed in connection with this disease: Fifty-nine (59) premises visited; 377 horses, 4 foals and 2 mules inspected; 154 horses on inspection proved healthy; 226 horses, 4 foals and 2 mules were quarantined on thirty-eight (38) premises. Of these, 89 horses, 1 foal and 2 mules, were reported as affected. Apart from the foregoing, numerous inspections were made by our officers for the purpose of supervising the re-dressing of diseased and contact animals, and to see that all contact matter had been properly cleansed and disinfected in accordance with the mange regulations of this department.

BLACK QUARTER.

This malady still continues to increase in different parts of the province. The number of applications received at this office for black-leg vaccine is *ipso facto* evidence of this. The reason of this dissemination is no doubt due to the farmers not taking the necessary precautions in disposing of carcasses of animals affected with the disease. While all information possible from a preventive point of view has been given to stock owners, the number of doses of vaccine furnished from this office continues to increase year after year.

| | |
|--|----------|
| Total number of doses of black-leg vaccine sold during the | |
| past year. | 2,992 |
| Instruments. | 35 |
| Needles. | 3 |
| Value. | \$167.85 |

RABIES.

This disease was reported to exist in the city of Saskatoon, and was investigated by Inspector Cameron, with negative results.

TUBERCULOSIS.

This office has been called upon to supply tuberculin to a number of private practitioners by owners of stock who wished to have their cattle tested for tuberculosis. One hundred and forty (140) cattle were submitted to the first test under the above heading, while thirty (30) head, tested in the first instance by private practitioners, were retested by the officers of this department, out of which nine (9) reacted and were ear-marked.

Under the heading of official testing, I may state that thirty-three (33) cattle were tested at the Experimental Farm at Indian Head, all of which proved healthy. Eleven (11) head of export cattle were tested with negative results, while the total number of import cattle tested was one hundred and twenty-six (126), one of which reacted and was rejected.

SHEEP SCAB.

Sheep scab did not make its appearance in this province during the past year. The officers of this branch, however, superintended the shipping of 18,365 sheep imported for immediate slaughter, which animals were allowed to proceed from Big Muddy on September 23 and October 2, 1912, to Pangman for shipment to Gordon, Ironsides and Fares Abattoir, at Winnipeg, Man.

SESSIONAL PAPER No. 15b

There were also during the year, 885 import sheep permitted to proceed to destination from ports of entry under special license. These animals were subsequently released upon reinspection, and the termination of the required quarantine period of thirty days.

INSPECTION OF STOCK YARDS AND STOCK CARS.

This branch of the work has been given a great deal of attention during the past year, and I am pleased to state that the officials of the Canadian Pacific railway, as well as other lines of railway in this province, have given our officers every assistance in carrying out the regulations of this department in every respect, both in the disinfection of stock yards as well as stock cars. This is supported by the fact that nearly double the number of cars were disinfected by the Canadian Pacific railway at Moosejaw during the past fiscal year. I may point out that special attention has been paid by our officer, Inspector Yake, at Moosejaw, to hog cars coming from hog-infected areas.

Total number of stock cars cleansed and disinfected at Moosejaw during the fiscal year ending March 31, 1913, one thousand three hundred and fifty-four (1,354).

FIELD OFFICERS' MOVEMENTS.

The following officers were added permanently to the Saskatchewan staff during the past year:—Thos. Babe, C. E. Waddy, Chas. Brind.

Inspector J. H. Shonyo was employed in the province from January 8, 1913, to March 28, 1913, after which he returned to Winnipeg, his permanent headquarters. Inspectors Macintosh and W. L. Hawke, were transferred to Manitoba and Alberta respectively, while Inspectors Olsen, Dufresne and Thompson, resigned their appointments. Inspector J. A. Stevenson reported at Regina from Winnipeg on October 10, for temporary duty in the hog cholera infected area. This officer returned to his permanent headquarters on the 30th of that month, his services being no longer required in that particular line of work. Inspector Tennent who was transferred for temporary duty in this province to assist in the glanders-infected areas, returned to Ontario on August 24, 1912, his services being no longer required in that respect. Inspector C. E. Waddy reported for duty in this province on September 2, while Inspector Beaudry was transferred to Quebec on August 30, 1912.

The services of Mr. Ernest Brewis are still retained in the Regina Office, as well as those of Miss Creswell, in the capacity of stenographer.

BOUNDARY INSPECTION WORK.

In connection with boundary work in this province, I beg to state that the personnel of the different ports in Saskatchewan, as far as veterinary inspectors are concerned, remains the same as at the close of last year. It is very evident, however, that numerous changes will have to be made in this respect in the very near future. Officers will have to be procured for the new ports which are to be opened on the Regina boundary branch of the Grand Trunk Pacific railway, as well as the new port which is to be opened between Wood Mountain and Willow Creek.

During the year I visited the ports of North Portal, Marienthal, and Big Muddy, for the purpose of ascertaining the quarantine requirements at these points and discussing matters in general with the officers relative to stock importation.

NORTH PORTAL QUARANTINE STATION.

The following figures show the number of animals presented for entry and inspection at the port of North Portal during the past fiscal year:—

| | |
|-----------------|------------|
| Horses.. . . . | 10,992 |
| Mules.. . . . | 659 |
| Cattle.. . . . | 7,435 |
| Buffalo.. . . . | 3 |
| Sheep.. . . . | 861 |
| Goats.. . . . | 12 |
| Swine.. . . . | 20 |
| Asses.. . . . | 17 |
| Fees.. . . . | \$2,979.20 |

Horses—

| | |
|--------------------|-------|
| Tested.. . . . | 1,652 |
| Retested.. . . . | 301 |
| Third test.. . . . | 21 |
| Reactors.. . . . | 49 |
| B.A.I.. . . . | 9,257 |

Mules—

| | |
|--------------------|-----|
| Tested.. . . . | 77 |
| Retested.. . . . | 10 |
| Third test.. . . . | 5 |
| B.A.I.. . . . | 582 |

Asses—

| | |
|----------------|----|
| Tested.. . . . | 2 |
| B.A.I.. . . . | 15 |

Cattle—

| | |
|-----------------------------|-----|
| Tested (1 rejected).. . . . | 119 |
|-----------------------------|-----|

MARIENTHAL (INSPECTION PORT.)

The following figures show the number of animals presented for entry and inspection at the port of Marienthal during the past fiscal year:—

| | |
|----------------|-------|
| Horses.. . . . | 482 |
| Mules.. . . . | 20 |
| Cattle.. . . . | 104 |
| Fees.. . . . | \$257 |

Horses tested—

| | |
|------------------|-----|
| First.. . . . | 240 |
| Second.. . . . | 81 |
| Reactors.. . . . | 13 |
| B.A.I.. . . . | 14 |

Mules tested—

| | |
|----------------|----|
| First.. . . . | 16 |
| Second.. . . . | 1 |

Five horses and 2 mules rejected for mange.

| | |
|-----------------------|---|
| Cattle tested.. . . . | 3 |
|-----------------------|---|

SESSIONAL PAPER No. 15b

WILLOW CREEK QUARANTINE STATION.

The following figures show the number of animals presented for entry at the port of Willow Creek during the past fiscal year:—

| | |
|--------------------|----------|
| Horses.. . . . | 1,660 |
| Mules | 9 |
| Cattle.. . . . | 2,140 |
| Sheep.. . . . | 5,893 |
| Fees.. . . . | \$935.26 |
| Horses tested— | |
| First test.. . . . | 1,441 |
| B. A. I.. . . . | 216 |
| Reactors.. . . . | Nil. |
| Mules tested— | |
| First test.. . . . | 7 |
| B. A. I.. . . . | 2 |

BIG MUDDY QUARANTINE STATION.

The following figures show the number of animals presented for entry and inspection at the port of Big Muddy during the past fiscal year:—

| | |
|---------------------|----------|
| Horses.. . . . | 1,305 |
| Mules.. . . . | 8 |
| Cattle.. . . . | 91 |
| Sheep.. . . . | 18,365 |
| Fees.. . . . | \$815.10 |
| Horses tested— | |
| First test.. . . . | 204 |
| Second test.. . . . | 27 |
| Reactors.. . . . | 6 |
| B.A.I.. . . . | 277 |
| Mules tested— | |
| First test.. . . . | 2 |

WOOD MOUNTAIN QUARANTINE STATION.

The following figures show the number of animals presented for entry and inspection at the port of Wood Mountain during the past fiscal year:—

| | |
|-----------------------|----------|
| Horses.. . . . | 1,290 |
| Mules.. . . . | 15 |
| Cattle.. . . . | 86 |
| Fees | \$471.65 |
| Horses tested— | |
| First test.. . . . | 915 |
| Second test.. . . . | 127 |
| Reactors.. . . . | 20 |
| B.A.I.. . . . | 83 |
| Cattle tested.. . . . | 4 |
| Mules tested— | |
| First test | 3 |

SESSIONAL PAPER No. 15b

APPENDIX No. 6.

(J. C. Hargrave, D.V.S., Inspector in Charge of Alberta.)

MEDICINE HAT, March 31, 1913.

The Veterinary Director General,
Ottawa.

SIR,—I have the honour to submit herewith my report for the year ending March 31, 1913, in connection with the Health of Animals Branch for the province of Alberta and such parts of British Columbia and Saskatchewan in which a portion of the work is under my supervision.

Efforts, as in the past, have been made towards the eradication of the various diseases that have existed in previous years, and, while in no case successful, and leaving much to be desired, yet I feel I am justified in saying progress has been made that will compare most favourably with past years.

DOURINE.

That the number of animals slaughtered for this disease can be reported as less than last year is very gratifying, and, although the outbreaks dealt with last year in both Saskatchewan and Alberta have not as yet been cleared up, yet I can assure you, and with considerable confidence, that all existing quarantines will be removed within the next four months. Such reports as have previously been made regarding the insidious nature of the disease are only too true, as is evidenced by the fact that even after remaining under observation for a period of a year or more, no symptoms are evidenced, and it is only with the assistance of a laboratory test that infected animals are detected. It is quite probable, therefore, that of such animals as now remain in quarantine, that we expect to deal with within the next four months, some will react, necessitating their destruction.

The value of this method of detection cannot be over-estimated and will, I think, prove the wisdom of the department in allowing Dr. Watson the opportunity afforded him last season in furthering his studies of laboratory methods in the diagnosis of this disease. I shall, however, leave to him further remarks relative to such laboratory tests, although I cannot refrain from drawing attention to the capable manner in which he has carried on this portion of the work which is proving of great assistance in the eradication of this disease.

STATISTICS OF ALBERTA.

| | |
|--|------------|
| Number of animals quarantined.. . . . | 160 |
| “ “ slaughtered (including 2 registered animals) | 10 |
| Value.. . . . | \$1,810.00 |
| Compensation.. . . . | \$1,206.66 |

STATISTICS FOR SASKATCHEWAN.

| | |
|---|------------|
| Number of animals in quarantine.. . . . | 48 |
| “ “ slaughtered (including 1 registered animal) | 8 |
| Value.. . . . | \$1,335.00 |
| Compensation.. . . . | 890.00 |

GLANDERS.

Attention was directed in my last report to the possible existence of this disease within the province to a greater extent than the statistics would indicate. The figures herewith appended verify that statement, as I have to report the slaughter of a much larger number than last year, the major portion of which was found in two outbreaks. Of these two outbreaks one was among the horses of construction outfits and the other outbreak was in the territory lying adjacent to the Saskatchewan boundary. In this latter outbreak, no doubt the source of infection extended from the adjoining province, and the possible source of infection in the first-named outbreak was undoubtedly contacts that were overlooked in dealing with an outbreak some eight or more years ago in the central western portion of this province.

STATISTICS FOR ALBERTA.

| | |
|---|-------------|
| Native horses tested once.. . . . | 2,566 |
| “ “ twice.. . . . | 476 |
| “ “ thrice.. . . . | 131 |
| “ “ four times.. . . . | 50 |
| “ slaughtered on inspection.. . . . | 1 |
| “ “ on first test.. . . . | 141 |
| “ “ on second test.. . . . | 9 |
| Value.. . . . | \$21,195 |
| Compensation.. . . . | \$14,129.96 |
| Number of horses presenting clinical symptoms.. . . . | 51 |
| Import horses tested once.. . . . | 83 |
| “ “ twice.. . . . | 39 |
| “ slaughtered on second test.. . . . | 1 |

In addition to the above there were 2 native horses tested in Saskatchewan.

MANGE.

Mange among horses was found on two premises only, necessitating the quarantining of 40 head, of which number 7 only showed evidence of the disease.

The disease among cattle was found to exist to a lesser extent than last year, as the appended figures would show.

There are numerous smaller districts within the area covered by the Special Mange Order that are now free from the disease but which, owing to their situation, cannot be removed from that area.

STATISTICS FOR ALBERTA.

| | |
|--|--------|
| Number of premises quarantined.. . . . | 183 |
| “ cattle quarantined | 63,513 |
| “ “ dipped once.. . . . | 85,132 |
| “ “ dipped twice.. . . . | 82,462 |
| “ “ hand treated.. . . . | 715 |

STATISTICS FOR SASKATCHEWAN.

| | |
|--|--------|
| Number of premises quarantined.. . . . | 45 |
| “ cattle quarantined.. . . . | 16,162 |
| “ “ dipped once.. . . . | 14,563 |
| “ “ “ twice.. . . . | 13,925 |

There were inspected for shipment to points outside the province:—

| | |
|----------------|--------|
| Cattle.. . . . | 50,143 |
| Horses.. . . . | 10,821 |
| Mules.. . . . | 79 |

TUBERCULOSIS.

During the year there were submitted to the tuberculin test by your inspectors, 74 head of cattle. There were also tested by private practitioners 100 head of cattle with tuberculin supplied by the department.

Reactors, 2, which were ear-marked in accordance with the regulations.

BLACK QUARTER.

This disease continues to make its appearance in various parts of the province; owners being advised as to vaccination and the proper disposal of carcasses.

There have been supplied to stockmen 4,170 doses of vaccine.

RABIES.

No further evidence of the outbreak dealt with last year in the Red Deer district has come to hand. We have, however, dealt with one outbreak in the northeast portion of the province, necessitating the quarantining of 32 premises. The exact source of infection in this outbreak was not clearly demonstrated. A suspected outbreak was also dealt with in the southern portion of the province, and as a preventive, eight (8) premises were quarantined for a time, but no losses were reported, and further investigation resulted in the removal of the restrictions.

HOG CHOLERA AND SWINE PLAGUE.

I again have to report the continuance of this disease, the source of infection in nearly every outbreak being found to be the feeding of uncooked garbage, although in one district it was introduced by hogs imported from Ontario.

| | |
|--|------------|
| Number of premises on which disease was found.. . . . | 13 |
| “ diseased and in contact hogs destroyed.. . . . | 343 |
| Value.. . . . | \$4,377.25 |
| Compensation.. . . . | 2,918.15 |

In addition to the above, 37 hogs were slaughtered and found fit for consumption.

BOUNDARY STATIONS.

PENDANT D'OREILLE.

Entries at this port:—

| | |
|---|----------|
| Horses (colts 13).. . . . | 95 |
| Mules.. . . . | 1 |
| Cattle (1 calf).. . . . | 6 |
| Sheep (3,057 lambs).. . . . | 11,847 |
| Goats.. . . . | 6 |
| Fees collected.. . . . | \$267.81 |
| Number of horses rejected and returned to the United States (1 reactor, 3 contacts).. . . . | 4 |

COUTTS.

Improvements consisting of stable, yards and unloading pens were installed at this port during the year, that now afford better facilities for importers and settlers.

Entries at this port:—

| | |
|--------------------------------|------------|
| Horses (135 colts)..... | 2,080 |
| Mules..... | 45 |
| Cattle (97 calves)..... | 344 |
| Sheep (4,176 lambs)..... | 85,586 |
| Swine..... | 6 |
| Goats..... | 4 |
| Fees..... | \$2,590.40 |
| Number of animals reacted..... | 7 |
| Contact..... | 48 |

TWIN LAKES.

Entries at this port:—

| | |
|-------------------------|----------|
| Horses (51 colts)..... | 584 |
| Mules..... | 2 |
| Fees..... | \$305.50 |
| Number of reactors..... | Nil. |

GATEWAY.

Entries at this port—

| | |
|-------------------------|-------|
| Horses (51 colts)..... | 802 |
| Mules..... | 37 |
| Cattle (1 calf)..... | 12 |
| Fees..... | \$387 |
| Number of reactors..... | Nil. |

KINGSGATE.

Entries at this port—

| | |
|-------------------------|----------|
| Horses (114 colts)..... | 2,947 |
| Mules..... | 124 |
| Cattle | 136 |
| Sheep..... | 461 |
| Swine | 2 |
| Buffalo..... | 10 |
| Fees..... | \$967.52 |
| Number of reactors..... | 1 |
| Contacts..... | 10 |

Respectfully submitted,

I have the honour to be, sir,

Your obedient servant,

J. C. HARGRAVE,
Chief Inspector for Alberta.

SESSIONAL PAPER No. 15b

APPENDIX No. 7.

(S. F. Tolmie, V.S., Inspector in Charge of British Columbia).

VICTORIA, B.C., March 31, 1913.

The Veterinary Director General,
Ottawa.

SIR,—I have the honour to submit a report covering the work of the Health of Animals Branch in British Columbia during the year ending March 31, 1913.

Boundary inspection was carried on at the fourteen inspection ports from Rykerts on the east to Victoria on the west; 5,133 horses and 50 colts, 622 cattle and 69 calves, 212 mules, 72,112 sheep, 191 goats, and 10 swine were inspected when entering Canada. Of this number, 24 horses reacted on test and were returned to the United States; \$4,847.79 in fees were collected; 19 animals were inspected for export.

All the inspection ports on the boundary are now provided with accommodation for live stock with the exception of Rykerts, where stabling has been provided for and will be completed during the coming year.

Six native horses were tested for glanders. No reactors were found.

Hog cholera has been much more prevalent this year than for many years, and in many instances the infection appeared to be attributable to the consumption of raw kitchen refuse. Your inspectors have warned swine owners on every possible occasion regarding the danger of infection from this source. There were 111 outbreaks dealt with during the year; 1,584 hogs were destroyed; the sum of \$11,487.19 was paid in compensation.

The publication of a bulletin by your branch dealing with this disease, should have a very beneficial effect in furnishing swine growers with full information regarding the best methods for the prevention and eradication of a disease that has caused considerable loss in this province.

A farm to farm inspection for hog cholera has been carried on during the year in those districts where a number of hogs were kept, with the result that several incipient outbreaks were discovered, and heavy loss prevented.

A thorough inspection of the cattle in the area quarantined for mange has been made, and a recommendation for raising the quarantine was forwarded to you with the result that an Order in Council was issued March 21, removing the quarantine.

A total of 5,364 cattle were dipped twice; 261 cattle were dipped once, and 345 cattle were hand treated during the year.

Blackleg has caused stockmen some loss in certain districts, but where blackleg vaccine has been promptly and carefully used the losses have been much reduced.

I am pleased to say that neither dourine, scab, nor rabies exist in this province.

The cleansing and disinfection of stock cars has been carefully conducted. This work is better organized than ever before and a much improved service is the result; 3,144 cars were cleansed and disinfected under Government supervision.

The visit of Mr. C. H. L. Sharman, of the Health of Animals Branch, Ottawa, to the coast during August and September, for the purpose of reorganizing the work in the offices of the branch, had a very beneficial effect and resulted in the work of your inspectors being greatly facilitated.

The publication of the bulletin on infectious abortion, by the Health of Animals Branch, will be much appreciated by stock owners, as it will disseminate valuable information regarding a disease that is a serious source of loss, especially in dairy districts.

4 GEORGE V., A. 1914

I addressed several meetings of stock owners on subjects pertaining to the work of this branch during the year.

The services of First Assistant Pathologist Hadwen have been found very valuable in carrying on investigations of reported animal diseases of an obscure nature.

With the completion of several new transcontinental railway lines across this province in the near future, and the consequent development of large new areas, the work of your representatives in this province will be increased in the near future.

I have the honour to be, sir,

Your obedient servant,

S. F. TOLMIE,

Inspector.

SESSIONAL PAPER No. 15b

APPENDIX No. 8.

(Chas. H. Higgins, D.V.S., Pathologist).

March 31, 1913.

The Veterinary Director General,
Ottawa.

SIR,—I have the honour to transmit this, my annual report as Pathologist to the Department for the year just ended.

The technical staff of the laboratory is similar to that of last year and consists, besides myself, of Doctors Evans, Reid, and Wickware, all of whom have been on duty during the entire year. The lay assistants have, as formerly, comprised Mr. Fee, the caretaker, Mr. Alfred Abraham, temporarily attached, and, in addition, Mr. David Paquette, clerk.

During the year I have undertaken experimental studies which, in the main, have had in view the improvement of the laboratory routine. While these studies have occupied a considerable amount of time, their details will more naturally appear in connection with special subjects, some of which are included in this report.

Recently, certain experiments have been undertaken with a view of determining the manner of absorption of metallic mercury when injected intramuscularly or subcutaneously in a finely divided suspension. These experiments have proven very interesting and instructive but for the present have been deferred, other more pressing matters requiring my attention. I may mention, however, that a five hundred gramme guinea pig tolerates the introduction of nine grammes of finely divided mercury and that this is completely absorbed in six weeks leaving behind an induration and thickening of the tissues at the site of inoculation.

I was permitted to attend the forty-ninth annual meeting of the American Veterinary Medical Association, held at Indianapolis, where I had charge of the programme for the section on Sanitary Science and Police, and have again been asked to assume a similar responsibility for the fiftieth annual meeting. In this section I presented a paper on anthrax vaccines outlining the method used by us in their disbursement.

In September, I attended the meeting of the Canadian Public Health Association, at Toronto, acting as secretary of the laboratory section. At the conclusion of the work of the section, I was asked to assume the responsibilities of convener of this section for the next meeting, which is to be held in Regina.

Prior to and during the absence of Dr. Evans on military duty, as an officer in the Canadian Army Veterinary Corps, he conducted experiments with a view to preventing the disability from strangles of horses used for annual training in the 8th Brigade, Canadian Field Artillery, to which unit he was attached. The details of this have been specially communicated to you and need no further mention here.

More recently, at your suggestion, he has undertaken work in connection with contagious abortion in cattle. In February, he prepared a paper on anesthetics which was presented at the annual meeting of the Central Canada Veterinary Association.

Dr. Reid was absent from duty early in the year for the purpose of giving a course of lectures in the French language to the veterinary students of Laval University. He was assisted in this work by specimens forwarded from this laboratory for demonstration purposes. During his employment here at the routine work, he drew attention to a fact we have not heretofore noted in the literature, namely, that in the examination of blood from cases of suspected black-leg, a peculiar charac-

4 GEORGE V., A. 1914

teristic odour was given off when drying smears on slides. This technical detail is now adopted as one of our routine methods. He has also been employed in special glanders work which will be referred to later.

Dr. Wickware has done some very important work in connection with various problems assigned to him during the year. He summarized his work on rabies in a paper read at the last annual meeting of the Central Canada Veterinary Association. One finding of his that has not been previously recorded is the fact that in many cases of gastro-enteritis in fowls there is a small microscopic tapeworm of three segments, concerning which more details will be given under poultry diseases.

During the year some attention has been given to ordinary research, but with the increase of the usual routine, systematic investigations have been practically out of the question. In the period under consideration we have dealt with 1,399 series of specimens, as compared with 720 series for the year preceding.

As formerly, the specimens dealt with have covered a wide range of conditions, and in the majority of instances were supplied by the Meat Inspection Division of the branch. These specimens from the Meat Inspection Division as a rule are for the purpose of enabling a positive diagnosis, where there is an uncertainty as to the condition, for the guidance of meat inspectors.

The much needed addition to our laboratory building is still anticipated and, when available, will render possible a much more satisfactory systematization of the work we are from time to time called upon to conduct.

Special attention will be given in this report to certain of our findings in connection with poultry disorders, as the literature is so meagre and the desire so great for data which will assist in checking losses from preventable causes.

To enable a ready reference to various features of our work, I will detail these under subject headings.

BIOLOGICAL PRODUCTS.

The manufacture of these products has been continued without interruption throughout the year, and the details in connection therewith are as follows:—

MALLEIN.

The disbursements of mallein for the past five years have been as follows:—

| | 1908-09. | 1909-10. | 1910-11. | 1911-12. | 1912-13. |
|----------------|----------|----------|----------|----------|----------|
| April..... | 3,861 | 2,905 | 9,041 | 295 | 2,438 |
| May..... | 3,140 | 3,525 | 3,815 | 2,940 | 4,417 |
| June..... | 2,702 | 1,440 | 4,280 | 4,555 | 2,201 |
| July..... | 3,000 | 2,191 | 4,655 | 7,595 | 4,254 |
| August..... | 2,347 | 1,660 | 2,720 | 3,735 | 1,890 |
| September..... | 2,200 | 2,700 | 2,320 | 4,395 | 2,305 |
| October..... | 1,935 | 2,670 | 3,005 | 4,295 | 1,984 |
| November..... | 2,567 | 2,850 | 3,281 | 3,175 | 2,268 |
| December..... | 1,420 | 1,085 | 1,920 | 860 | 1,234 |
| January.... | 905 | 1,760 | 2,405 | 4,660 | 3,239 |
| February.... | 1,260 | 2,290 | 2,640 | 3,360 | 3,001 |
| March..... | 7,460 | 7,950 | 10,030 | 8,015 | 8,045 |
| | 32,815 | 32,996 | 50,112 | 47,880 | 37,276 |

It will be noted that there is a slight falling off in the disbursements of mallein, this, however, is undoubtedly due to the disappearance of glanders in various parts of the country.

SESSIONAL PAPER No. 15b

Special mallein for the opthalmic reaction has been prepared in very limited quantities.

TUBERCULIN.

The disbursements of tuberculin for the past five years are as follows:—

| | 1908-09. | 1909-10. | 1910-11. | 1911-12. | 1912-13. |
|----------------|----------|----------|----------|----------|----------|
| April..... | 878 | 648 | 654 | 673 | 1,023 |
| May..... | 829 | 418 | 1,178 | 810 | 1,196 |
| June.. | 992 | 496 | 568 | 505 | 620 |
| July..... | 1,190 | 887 | 432 | 645 | 770 |
| August..... | 323 | 760 | 544 | 185 | 958 |
| September..... | 214 | 335 | 632 | 477 | 549 |
| October.... | 458 | 474 | 381 | 632 | 1,410 |
| November.... | 826 | 561 | 801 | 1,340 | 1,573 |
| December.... | 807 | 488 | 621 | 420 | 1,426 |
| January..... | 322 | 282 | 1,087 | 899 | 1,352 |
| February.... | 257 | 634 | 561 | 420 | 761 |
| March .. | 1,035 | 617 | 797 | 957 | 1,622 |
| | 8,061 | 6,600 | 8,256 | 7,963 | 13,260 |

Special tuberculin for the intra-dermal testing of cattle has been prepared in limited quantities.

BLACK-LEG VACCINE.

Black-leg vaccine has been disbursed as formerly, and our disbursements for the past five years are as follows:—

| | 1908-09. | 1909-10. | 1910-11. | 1911-12. | 1912-13. |
|----------------|----------|----------|----------|----------|----------|
| April..... | 2,815 | 1,330 | 843 | 2,076 | 2,140 |
| May..... | 1,177 | 1,114 | 2,013 | 826 | 2,478 |
| June..... | 601 | 1,714 | 2,866 | 463 | 4,960 |
| July..... | 572 | 1,007 | 678 | 416 | 1,205 |
| August..... | 550 | 310 | 427 | 1,023 | 1,292 |
| September..... | 734 | 899 | 569 | 1,328 | 658 |
| October..... | 260 | 300 | 4,094 | 1,019 | 1,398 |
| November..... | 218 | 788 | 1,801 | 568 | 405 |
| December..... | 410 | 380 | 345 | 463 | 950 |
| January..... | 35 | 136 | 147 | 55 | 241 |
| February..... | 420 | 4,761 | 380 | 188 | 1,240 |
| March..... | 902 | 730 | 3,106 | 1,085 | 3,475 |
| | 8,064 | 13,469 | 17,264 | 9,510 | 12,448 |

ANTHRAX VACCINE.

The disbursements of anthrax vaccine during the year have been considerably smaller than during the year immediately preceding. This, however, is naturally to be expected owing to the irregular appearance of outbreaks of this disease.

The disbursements for the past five years have been as follows:—

| | 1908-09. | 1909-10. | 1910-11. | 1911-12. | 1912-13. |
|----------------|----------|----------|----------|----------|----------|
| April..... | | | 21 | 56 | |
| May..... | | 38 | 70 | 60 | 50 |
| June..... | | 112 | | 200 | 50 |
| July..... | 265 | 47 | 36 | 412 | 116 |
| August..... | 75 | 40 | | 40 | 57 |
| September..... | 10 | 62 | | 240 | 52 |
| October..... | 43 | 17 | 32 | 12 | |
| November..... | | | | | |
| December..... | 25 | | | | 62 |
| January..... | 10 | | | 6 | 20 |
| February..... | | | | 330 | |
| March..... | 36 | 70 | 95 | | |
| | 464 | 586 | 254 | 1,356 | 407 |

GLANDERS.

As I have heretofore mentioned, Dr. Reid has conducted quite a series of experiments with the newer methods of diagnosing glanders. The major portion of this work was the diagnosis through the fixation of the complement.

At the outset some difficulty was experienced in the proper sensitization of the rabbits used. This having been overcome, he experienced but little trouble. The use of this method in a number of obscure cases led to a confirmation of the results obtained with mallein by the inspectors in the field. As a routine method we hold, as formerly, that notwithstanding its accuracy when carefully and conscientiously conducted, it will not lend itself to a routine application under existing conditions, principally on account of the time involved and the loss of that most important factor from the inspector's viewpoint, the clinical evidence of a reaction.

The time spent in mastering its details has not been lost, as this method will be applicable to other disorders for which present diagnostic procedures are uncertain.

We are planning to use this method in connection with problems confronting us with other diseases during the coming year.

We believe that the subcutaneous injection of a potent mallein is the best method of determining the presence or absence of glanders in a suspected horse.

GELATIN.

As formerly, we have examined a large number of gelatins which it was desired to use with the jellied food products at the various packing houses under the Meat and Canned Foods Act.

We are using the standard method of examination, original with us and reported in our last annual report, and in connection with which some slight modifications have been made to meet special conditions. This seems the most reasonable method of examination, and has been favourably commented on by Dr. Amyot, Provincial Bacteriologist, and others who have studied its details.

WATER EXAMINATIONS.

As reported last year, we are still supervising the sterilizing machines installed in the various Government buildings. This work now occupies a considerable amount of time owing to the fact that a number of buildings have been added to those reported on last year.

SESSIONAL PAPER No. 15b

The raw water has shown evidence of sewage contamination, excepting at intervals, and the degree of contamination has varied at different times.

The safe drinking water supply known to have passed through the sterilizing machines has never shown evidence of sewage contamination. Further details in connection with our water work can add but little to this report and therefore are not included.

TUBERCULOSIS.

During the year, some minor experimental work has been conducted with this disease of a very interesting character. Some of this consisted in the examination of material supplied by the Hospital for Sick Children, in Toronto, to determine whether the disease originated from a human or a bovine source. Our aim was to determine whether or not the bovine type of infection was common in these cases.

In the material with which our experiments were conducted we have not found evidence of any but a human infection.

The differentiation of types is, however, a somewhat tedious procedure, and requires a considerable length of time for its full accomplishment. I anticipate that we will be able to proceed with this work further for the purpose of securing definite statistics.

The necessary time involved is considerable and can only be spared from our routine work at irregular intervals.

In this connection, Orth has recently (Berlin Medical Society, February 19, 1913) drawn attention to the great danger of infecting humans with material of bovine origin.

POULTRY DISEASES.

We have devoted considerable time to the disorders of poultry, not only during the current year, but for a number of years past. It is not possible in this report to enter into all of the details connected with this work. We will, however, consider such conditions as have impressed us as being unusual.

GASTRO-ENTERITIS.

There is no disorder among fowls more frequently observed by us than gastro-enteritis, or an inflammation of the mucous membrane of the gizzard and intestines. At the autopsy on an infected bird attention is at once drawn to the thickening of the intestinal walls. If cut open and allowed to remain in luke warm water for a few minutes, what appear to be short hairs are observed projecting from the mucous or inside surface. Closer examination reveals these hairy processes to be the villi or projections from the mucous membrane greatly enlarged and inflamed. This inflammatory condition we have found to be due to a number of causes, the most common among which are, the use of an unsuitable food, and parasites. Where the food is unsuitable, a close inquiry reveals that the birds have been fed on soft or sloppy food, with little or no hard grain. The digestive apparatus is not designed to take care of food of such a character, therefore the system is overtaxed by the introduction of too concentrated and too easily digested food material, the result being that the normal function of the digestive organs is interfered with, and an inflammatory condition results.

We have found that this can be most easily corrected, in the majority of cases, by a fasting of the birds for forty-eight hours, and during this period allowing nothing save water to which has been added muriatic acid (Acid Mur. dil. B.P.) in the proportion of a teaspoonful to the quart. At the conclusion of the forty-eight hours, whole grain is given sparingly, and at the end of a week the birds may be allowed their usual full diet.

4 GEORGE V., A. 1914

Dr. Wickware has found in a considerable number of cases that there was associated with this gastro-enteritis a very minute tape worm of but three segments, the whole being, in the largest specimens, less than a millimetre in length. No attempt has been made to identify this species, as material has been available at irregular intervals only, and the usual treatment which we have above recorded for gastro-enteritis proves effective in carrying the birds through the acute attack.

Many times the disorder which we have considered under the general heading of gastro-enteritis has been looked upon by those interested as fowl cholera, but the absence of any specific infective agent which could be associated with the disorder has proven that this is not the case.

TUBERCULOSIS IN POULTRY.

During the year, material from fifteen outbreaks of tuberculosis in poultry has been received. These outbreaks have been principally in Ontario, but material from one was received from the province of Manitoba. No systematic effort, however, has been made to determine the distribution of this disease in Canada, and, therefore, the data we have secured only indicate definite outbreaks which were causing serious losses.

During the year, we conducted experiments with a view of determining the possibility of transmitting tuberculosis through the eggs laid by tuberculous fowls. For these transmission experiments we secured a flock of tuberculous fowls, quartered them in special quarters, hatching the eggs in an incubator.

When sufficient eggs had accumulated to fill the small incubator secured for the purpose (one of sixty egg capacity) the fowls from which they had been obtained were autopsied. Prior to autopsy, however, they were tested with tuberculin prepared from an organism of the avian type, with negative results. Negative results also followed the use of a special tuberculin intra-ocularly (dropped in the eye) and intro-dermally (injected into the skin).

Ten of the fowls above referred to, were affected with tuberculosis in various stages, while one failed to show lesions. The principal organs affected were the livers and spleens, the other organs did not show lesions, save in one instance. In this hen a chronic tubercular peritonitis had developed, with adhesions. Small pedunculated tuberculous nodules adhered to the outer coat of the intestines. Ascitic fluid was present, and emaciation marked.

The transmission experiments were not of as conclusive a nature as we desired, owing principally to the fact that the incubator which we were using did not give satisfactory results. Nine chicks only were secured from sixty eggs, of which over eighty per cent proved to be fertile. This machine later failed to give satisfactory results with eggs from another source.

Some of the chicks were autopsied at intervals throughout the year, the last being destroyed on the 30th instant. In none of these chicks were we able to detect lesions of tuberculosis.

These negative findings, however, do not prove that tuberculosis may not be transmitted in this manner, for, at the autopsy of the fowls providing us with the eggs used in this connection, lesions were present in over 90 per cent, and in no instance were they of special character. At the autopsies, Dr. Wickware did not find evidence of tuberculosis involving the ovaries or the oviduct.

We hope that circumstances will again permit our taking up a similar series of experiments for the purpose of checking the results herein recorded.

ENTERO-HEPATITIS.

This affection of turkeys has again engaged our attention and while we have nothing of a startling nature to offer we have made some progress in our knowledge of the disease.

SESSIONAL PAPER No. 15b

Our serious investigations on *entero-hepatitis* or black-head were commenced in the spring of 1912, immediately the plant for the purpose was available. This plant, which is the best we have been able to devise under the circumstances, consists of four turkey shelters, each having approximately an acre of land connected therewith, isolated by suitable deadlines.

As the season was well advanced when this plant was available, we secured a flock of young turkeys which were, to the best of our knowledge, free from infection. Of these, we have lost four from *entero-hepatitis* and one from a tapeworm infestation.

From our observations, we have come to the conclusion that birds once affected may, and frequently do, become chronic carriers of the disease. In this way the disease is carried over from one season to the next in the body of the bird. We do not consider that this is the only means of conveying the infection, as we have observed the disease in birds other than the turkey, namely, the common fowl.

Experience has demonstrated very forcibly that *entero-hepatitis* may make its appearance where everything points to the common fowl as the source of the infection, and the fact that they may contract the disease is evidence, not only of the possibility but the probability that the infection is conveyed through them as hosts.

Our work during the season has further demonstrated that the rearing of poults under such conditions as will enable the immediate removal of an infected individual and the disinfection of the house in which they are quartered, assists in reducing the danger of communicating the disease to others in the flock. We have found it possible to keep turkeys on a much smaller range than has ordinarily been considered necessary for their well-being. Whether it is desirable or advisable to restrict their range is not a feature of our experiments, but a necessity, and is here mentioned to indicate one of the difficulties which must necessarily accompany any experimental study with this disease.

By making a full use of the knowledge and experience which we have already gained, I anticipate that our work during the coming year will prove of a much more satisfactory nature.

We have no better medicinal treatment to offer than the use of hydrochloric acid in the drinking water. While we are aware that the use of this agent will not always result in carrying an affected bird over the acute attack, it does exert a beneficial effect.

It is desirable that experimental use be made of other medicinal agents, and we anticipated being able to secure some data during the season just closed. However, the natural recovery of the birds secured for this purpose without recourse to special therapeutic measures delayed our work in this regard for another year.

Apart from the regular duties connected with the work of the laboratory, I have prepared detailed plans, blue prints, and specifications from which buildings have been erected for the uses of the branch at various points.

With the general increase in all branches of the work of the laboratory, new equipment has been added as actually required. Owing to the limited space available in our present building, it has not been possible to find room for certain pieces of apparatus that would greatly facilitate and improve many phases of our work.

With your intimate knowledge of our necessities and the hearty co-operation already manifested in improving the conditions under which our work is conducted, I am sure that provision will be made to meet such requirements as may from time to time be presented.

I have the honour to be, sir,

Your obedient servant,

CHAS. H. HIGGINS,

Pathologist.

4 GEORGE V., A. 1914

APPENDIX No. 9.

(Seymour Hadwen, D.V.Sci., Pathologist in charge Veterinary Research Laboratory,
Agassiz, B.C.)

March 31, 1913.

The Veterinary Director General,
Ottawa.

SIR,—I have the honour to submit my annual report for the year ending March 31, 1913. I am pleased to report progress in the work of Hæmaturia at Agassiz. Though the cause of the disease is still unknown, yet I feel that an advance has been made. The laboratory and barns erected last year prove to be most satisfactory.

The first and most important point to settle with regard to Hæmaturia was to decide if it was contagious or not; in all the field observations I have made (see report of 1911), there seems to be no direct evidence of its being contagious. The only argument favouring contagion was that more cases of the disease were to be found on one farm than another.

To prove or disprove this theory, a number of calves have been kept in contact with diseased cattle, and attempts have been made to infect them, first, by blood inoculation, secondly, by ingestion, thirdly, by inoculating urine, fourthly, by introducing portions of a diseased animal's bladder into that of a healthy one, also by siphoning urine from a diseased animal's bladder into that of a healthy one.

Up to now, none of these means have been successful. Calves have been killed at three and six months' interval and no definite lesions have been found. At the present time, seven calves and two healthy cows are being experimented on, and by autumn they will have been under experiment for a year. The total number of animals which have been exposed to infection numbers seventeen.

The protocols relating to cows 35 and 42 are given in full to illustrate the chronic nature of the disease and to show the course the affection usually runs. A number of observations which have been made on the urine are given, showing the amounts voided by healthy and diseased animals and the percentage of blood lost in the twenty-four hours.

By kind permission of Mr. H. L. Keegan, Assistant Superintendent at Agassiz, I append an article of his which embodies some of my own observations on the amount of urine a cow voids in the twenty-four hours. Strange though it may seem, I could find no accurate data referring to this in the veterinary literature I had at my disposal, and for this reason was obliged to collect the urine for a period of twenty-four hours in order to make accurate determinations of the blood lost for that period.

During the year, a number of specimens have been sent in for diagnosis by the various inspectors and in my spare time, as heretofore, I have continued my observations on blood-sucking insects. A bulletin was prepared and published on Warble Flies, also an article on *Derma-centor variabilis* was published in 'Parasitology.' I would recommend that this article be reprinted with this report. A short life-history of *Derma-center Venustus* is given, and a new tick is recorded for Canada, i.e., *Ornithodoros megnini*.

In conclusion, I desire to thank you for the kind interest and help you have shown in the work, and to record my appreciation for the way in which Superintendent Moore, at Agassiz, has assisted me.

I have the honour to be, sir,

Your obedient servant,

SEYMOUR HADWEN.

SESSIONAL PAPER No. 15b

PROTOCOL COW No. 35.

Cow 9 years old; locality, Mount Lehman, B.C.

| DATE. | NOTES ON CONDITION. |
|-----------------------|--|
| Nov. 2-5, 1910 | Hæmaturia reported. |
| " 26, 1910 | Hæmaturia observed in morning. |
| Nov. 26-Dec. 19, 1910 | Urine clear. |
| Dec. 19, 1910 | Urine slightly tinged at end of urination. |
| " 27, 1910 | Calcium Lactate oz. powders once a day. |
| " 29, 1910 | Hæmaturia. |
| Jan. 8, 1911 | Urine clear. |
| " 16, 1911 | Urine clear. |
| " 29, 1911 | Hæmaturia. |
| Feb. 2, 1911 | Urine clear. |
| " 5, 1911 | Urine clear. |
| " 6, 1911 | Last few drops of urine tinged. |
| " 9, 1911 | Urine clear. |
| " 9-23, 1911 | Urine clear. |
| March 1-17, 1911 | Urine clear. |
| " 17, 1911 | Given Calcium Lactate 4 powders 2 dram doses. |
| " 27, 1911 | Urine clear. |
| April 30, 1911 | Cow turned out on low land (where no red water has been found) since beginning of the month, is doing well. |
| May 4, 1911 | Looks well. Blood examined, poikilocytosis only. |
| " 14, 1911 | Cow brought back to high land. |
| " 16, 1911 | Hæmaturia slight, cow calved a few days ago. |
| Feb. 20, 1912 | Cow purchased for \$30. In fair condition, has been passing red water at intervals, and is due to calve in June. |
| " 21, 1912 | Cow driven six miles by road. Passed a large quantity of red water soon after starting and continued to do so at intervals while being driven. |
| March 6, 1912 | Urine getting lighter every day. Cow kept tied up. |
| " 17, 1912 | Urine clear. |
| " 21, 1912 | Turned out for first time. |
| " 22-31, 1912 | Urine clear, is picking up in flesh fast. |
| April 1, 1912 | Weight, 980 pounds. |
| April 5, 1912 | Hæmaturia. |
| " 10, 1912 | Slight hæmaturia. |
| " 16, 1912 | Hæmaturia. |
| " 17, 1912 | " |
| " 27-30, 1912 | Slight Hæmaturia. |
| May 1, 1912 | Hæmaturia. Weight 1,050 pounds. Cow picked up well all month, despite hæmaturia. |
| " 12-14, 1912 | Hæmaturia. |
| " 15, 1912 | " |
| " 16, 1912 | " |
| " 17, 1912 | " |
| " 19-20, 1912 | " |
| " 20, 1912 | " |
| " 21, 1912 | " |
| " 22, 1912 | " |
| " 23-31, 1912 | " |
| June 1, 1912 | Weight 1,030. |
| " 2-5, 1912 | Urine dark red. |
| " 5, 1912 | Urine contains 1.3 per cent blood solids. |
| " 7, 1912 | Urine contains trace of blood solids. |
| " 13, 1912 | " " " " " |
| " 14, 1912 | " " " " " |
| " 15, 1912 | " " " " " |
| " 16, 1912 | " " " " " |
| " 17, 1912 | " " " " " |
| " 21, 1912 | " " " " " |
| " 23, 1912 | Urine contains .25 per cent blood solids. |
| " 25, 1912 | " " .75 " " " |
| " 28, 1912 | " " .25 " " " |
| " 29, 1912 | " " .75 " " " |

This cow calved on June 6; she has milked well all month, but has lost flesh.

July 1.—Cow weighs 887 pounds.

4 GEORGE V., A. 1914

Total urine passed in twenty-four hours by cow No. 35, started at 6 p.m., July 11, 1911, and finished at 6 p.m., July 12, 1911:—

| | |
|---------------------------------------|------------------------|
| 7.15 p.m. | 1,200 c.c. |
| 9.20 " | 1,075 c.c. |
| 11.22 " | 1,130 c.c. |
| 2.00 a.m. | 900 c.c. |
| 4.45 " | 1,500 c.c. |
| 7.55 " | 400 c.c. (flow missed) |
| 10.20 " | 1,100 c.c. |
| 12.00 noon | 730 c.c. |
| 2.40 p.m. | 1,450 c.c. |
| 5.35 " | 1,290 c.c. |
| <hr/> | |
| 10,775 c.c. computed. | |
| 10,210 c.c. actual measurement at end | |
| <hr/> of experiment. | |
| 565 c.c. lost by evaporation, etc. | |

Sample taken of total urine contains 2.75 per cent of blood solids plus precipitates in urine = 280.775 c.c. of solids, = 1,101.784 c.c. of actual blood.

In order to get this result, 5 c.c. of blood was drawn from the jugular and mixed with 5 c.c. of urine, the result being that 1.275 c.c. of solids were thrown down, equalizing 25.5 per cent of solids in this cow's blood.

Speed of centrifuge between 1,500 to 2,000 revolutions per minute.

| | | |
|--|---------|---|
| July | 1, | 1912—1.25 per cent blood solids in urine. |
| " | 2, | 1912—Trace blood solids in urine. |
| " | 3, | 1912—1 per cent blood solids in urine. |
| " | 5, | 1912—1 per cent " " " |
| " | 6, | 1912—0.5 per cent " " " |
| " | 9, | 1912—0.25 per cent " " " |
| " | 11, 12, | 1912—2.75 per cent " " " |
| " | 13, | 1912—0.25 per cent " " " |
| July | 14, | 1912—.20 per cent blood solids in urine. |
| " | 25, | 1912—.75 " " " |
| " | 25-31, | 1912—Slight hæmaturia. |
| Aug. | 1, | 1912—Weight, 855 pounds. |
| " | 1-26, | 1912—Bad hæmaturia, clots frequently passed. |
| " | 27, | 1912—Urine gellatinous, coagulates on standing. |
| Sept. | 1, | 1912—Weight of cow, 800 pounds. |
| " | 3, | 1912—Urine coagulates on standing. |
| " | 3-11, | 1912—" " " " |
| " | 11-18, | 1912—Hæmaturia constant. |
| " | 18, | 1912—Hæmaturia 1.5 per cent. |
| " | 18-30, | 1912—Hæmaturia. |
| " | 30, | 1912—Is being given two dram doses of Ferri Phos. twice a day. |
| Oct. | 1, | 1912—Weight, 667 pounds. |
| " | 2, | 1912—Urine 1 per cent blood solid. |
| " | 3, | 1912—Urine coagulates in gutter. |
| " | 4, | 1912—Urine .75 per cent blood solid. Blood takes 11 minutes to coagulate. |
| NOTE.—This blood took much longer to coagulate on previous tests. It has been observed in previous cases that the blood of moribund animals though thinner has increased in clotting property. | | |
| " | 18, | 1912—Urine coagulates in gutter. Blood solids $\frac{1}{2}$ per cent. |
| " | 26, | 1912—Blood solids $\frac{1}{2}$ per cent. |
| " | 30, | 1912—" " " " |
| The amount of blood solids in the urine does not correspond with the amount of blood being lost, as it is very poor in R.B.C. More evidence of the increased clotting property of the blood is shown by the fact that clots were passed from Oct. 10th to 14th, and from 17th to 25th. The clots were very light coloured, and at times the urine was found coagulated in the gutter. The urine was also pale, denoting a great decrease in R.B.C. The cow's condition during the month was very bad, although she ate sparingly throughout. | | |
| " | 31, | 1912—Weight, 685 pounds. |
| Nov. | 1-15, | 1912—Passed clots daily. |
| " | 11, | 1912—.2 per cent of blood solids, plus clots. Blood count on same day shows:— |
| Mononuclear 50.8 per cent. | | |
| Polynuclear 43 " " | | |
| Eosinophiles, 6.2 " ; 500 cells counted. | | |
| Poikilocytosis, polychromasia, and punctate degeneration, also a few nucleated R.B.C. | | |
| This count shows that pus contamination was not present and that cocci did not gain entrance to the bladder or kidneys. | | |
| Examination of the urine showed a few bacteria, but no cocci. | | |

SESSIONAL PAPER No. 15b

PROTOCOL COW No. 35.—*Continued.**Post-mortem Notes.*

November 15, 1912. The cow was shot on November 15, being in a moribund condition.

Marked emaciation.

Liver, 14 pound, yellow and degenerate looking.

Spleen; 14 ounce, small.

Heart; studded with degenerate areas.

Lungs; practically normal, a little emphysema at apices.

Kidneys; normal.

Bladder; studded with petichiae and small pappilomata.

Glands; normal, with the exception of those from the lumber region which had a pink pigmented appearance.

Microscopical findings.—

Liver; cells vacuolated degenerated and pigmented.

A few clumps of bacilli found.

Spleen; a few bacilli.

Heart; sarcocystis.

Kidneys; apparently normal.

Bladder; smears contained numerous degenerated cells.

Treatment.—The treatment of this cow was not seriously undertaken; she was simply well-fed, and got a few doses of Ferri Phos. The urine from this cow was given to calves mixed with their milk in an attempt to transmit the disease. The cow emaciated rapidly during the last ten weeks of her life. On Sept. 1 her weight was 800 pounds.

Oct. 1, Weight, 667 pounds.

Oct. 31, Weight 685 pounds.

At death, estimated at 600 pounds.

PROTOCOL COW No. 42.

Cow 12 years old; locality, Mount Lehman, B.C.

DATE.

| | |
|------------------|---|
| Feb. 21, | 1911—Cow has had hæmaturia on and off since the summer. |
| March 30, | 1911—Cow going down hill fast, blood poikilocytosis blue and punctate cells. |
| April 27, | 1911—Cow turned out; is reported to be holding her own. |
| Feb. 20, | 1912—Purchased for \$25. Owner says cow has not passed red water since autumn. She has just calved although in poor flesh is milking well. |
| Feb. 20—Mar. 31, | 1912—Cow improving on good feed, milks well, and shows no signs of hæmaturia; is giving on an average 30 pounds per day. (Twelve powders.) One powder given once a day of Ferri Phos. and Nux Vomica. |
| April 1, | 1912—Weight, 850 pounds. |
| " 1-31, | 1912—Urine clear. |
| May 1, | 1912—Weight, 895 pounds. Cow picking up and is milking fairly well. |
| " 1-31, | 1912—Urine clear. |
| June 1, | 1912—Weight, 880 pounds. |
| July 1-31, | 1912—Urine clear all month. |
| Aug. 1, | 1912—Weight, 937 pounds. |
| " 1-30, | 1912—Urine clear. |
| Sept. 1, | 1912—Weight, 950 pounds. |
| " 1-30, | 1912—Urine clear. |
| Oct. 1, | 1912—Weight, 925 pounds. |
| " 1-13, | 1912—Urine clear. |
| " 14-18, | 1912—Cow off her feed, not feeling well. |
| " 22, | 1912—Slight hæmaturia. |
| " 23-26, | 1912—Urine clear. |
| " 26, | 1912—Urine slightly tinged in the evening. |
| " 26-31, | 1912—Remained clear. |
| " 31, | Average quantity of milk per diem for October, 15 pounds. |
| Nov. 1, | 1913—Weight, 970 pounds. |
| " 2, | 1912—Urine clear. |
| " 3-4, | 1912—Urine tinged. |
| " 5, | 1912—Red. |
| " 5-13, | 1912—Tinged. |
| " 14, | 1912—Slightly tinged. |
| " 15-28, | 1912—Passed small clot. |
| " 28, | 1912—Urine increasing in colour. |
| " 29-30, | 1912—1½ per cent blood solids in urine. |
| " 29-30, | 1912—Urine red. |
| " 31, | Average percentage of milk for month, 12 pounds. |
| Dec. 1, | 1912—Weight, 930 pounds. |
| " 1, | 1912—Urine very red... |
| " 2, | 1912—Urine contains 2 per cent and 2.4 per cent blood solids in the morning and afternoon respectively. |
| " 3, | 1912—Urine contains 1.9 per cent and 2.2 per cent respectively. |
| " 5, | 1912—Few small clots passed. Coagulates on barn floor. |

PROTOCOL COW No. 42.—Continued.

| | | | |
|------|--------|--|---|
| Dec. | 6, | 1912—Urine red..... | Urine contains 1·5 per cent and 1·2 per cent of blood solids in morning and afternoon respectively. |
| " | 7-12, | 1912— " better colour... | |
| " | 10, | 1912—Started giving Ferri Phosphate powders twice a day. | |
| " | 13, | 1912—Urine red..... | Urine contains 1·2 per cent blood solids. |
| " | 13-17, | 1912— " | |
| " | 17, | 1912— " | Commenced milking only once daily. |
| " | 18, | 1912— " | Urine contains 2·2 per cent, 1 per cent and 1·5 per cent of blood solids at three consecutive urinations. |
| " | 19, | 1912— " | Urine contains 1·2 per cent blood solids. |
| " | 20, | 1912— " | " 1·2 " |
| " | 21, | 1912— " | " 1·0 " |
| " | 22, | 1912— " | Blood count— Polynuclears, 18·625 per cent..... Mononuclears, 50·975 " Eosinophiles, 30·3 " Mast-cells, 0·1 " Poikilocytosis. Punctate degeneration |
| " | 23-27, | 1912—Haematuria. | and Polychromasia. |
| " | 28, | 1912— " | Urine contains 1 per cent blood solids. |
| " | 30, | 1912— " | Test for clotting properties of blood, 11 a.m., 30 min. to clot. Urine 1·7 per cent. |
| " | 31, | 1912— " | Blood solids 1·4 per cent. |
| " | 31, | 1912— " | " 1·5 " |
| | | | This cow averaged 8½ pounds of milk per day all month. |
| Jan. | 1, | 1913— | |
| " | 2, | 1913— " | Urine contains 1·4 per cent blood solids. |
| " | 3, | 1913— " | |
| " | 4, | 1913— " | " 1·8 " " |
| " | 5-7, | 1913— " | |
| " | 8, | 1913— " | At 11.00 a.m. urine contains 1·1 per cent solids. " 1 30 p.m. " 1·4 " " " 3.30 p.m. " 1·0 " " " 5.30 p.m. " " |
| " | 9, | 1913— " | " 11.00 a.m. " 2·1 " " " 3.00 p.m. " 1·6 " " " 5.30 p.m. " 1·6 " " " 2.00 p.m. " 1·8 " " " 12.00 a.m. " 1·5 " " |
| " | 10, | 1913— " | |
| " | 11, | 1913— " | |
| " | 8, | 1913— " | Blood count— Mononuclears, 39·2 per cent Polynuclears, 31·0 " Eosinophiles, 27·8 " Mast-cells, 2·0 " Poikilocytosis, Polychromasia. Punctate degeneration. |
| " | 13, | 1913— " | Contains 1·8 per cent solids. |
| " | 14, | 1913— " | " 2·5 " " |
| " | 20, | 1913— " | At 9 a.m. urine contains 1·1 per cent solids. " 4 p.m. " 1·3 " " " 6 p.m. " 1·0 " " |
| " | 21, | 1913— " | Experiment with pot. chlorate. Started giving 16 gram doses, t. i. d., 6 powders being given in all. At 3 p.m. urine contains 1·5 per cent solids. |
| " | 22, | 1913— " | " 5 p.m. " 2·1 " " |
| " | 23, | 1913— " | " 3 p.m. " 1·8 " " |
| " | 24, | 1913— " | " 12 a.m. " 2·3 " " " 4 p.m. " 2·2 " " " 12 a.m. " 2·8 " " " 5 p.m. " 1·3 " " " 10 a.m. " 1·8 " " " 10 a.m. " 1·4 " " " 9 a.m. " 1·8 " " " 9 a.m. " 3·1 " " " 11 a.m. " 1·1 " " |
| Feb. | 1, | 1913— | |
| " | 3, | 1913— " | |
| | | | This cow averaged 7¾ pounds of milk per day all month. |
| Feb. | 4, | 1913—Urine contained 1·9 per cent blood solids. | |
| " | 5, | 1913— " " 1·1 " " | |
| " | 6, | 1913— " " 1·2 " " | |
| " | 7, | 1913— " " 1·8 " " | |
| " | 8, | 1913— " " 1·8 " " | |

EXPERIMENT.—5 c.c. of clear urine, and 5 c.c. of jugular blood were mixed together and centrifuged; the reading was 23 per cent of blood solids thrown down, therefore, if her urine contains 1·8 per cent of blood solids and she passes 8880 c.c. of urine during the 24 hours (amount passed in test last summer) she is losing 695 c.c. of blood in the 24 hours. The solids, other than R.B.C., are not taken into account, being in small amount.

SESSIONAL PAPER No. 15b

PROTOCOL COW No. 42.—*Continued.*

| | | |
|-------|-----------|---|
| Feb. | 10, | 1913—Urine contained .8 per cent blood solids. |
| " | 14, | 1913—Blood count.-- |
| | | Mononuclears 41.7 per cent |
| | | Polynuclears 26.57 per cent |
| | | Eosinophiles 30.86 per cent |
| | | Mast, cells .86 per cent |
| | | 700 counted. |
| | | Poikilocytosis, a few punctate cells and nucleated Reds and slight Polychromasia. |
| | | Weight of cow, 850 pounds. Thus the cow has only lost 80 pounds since December. She has been well fed and has been getting plenty of bran and roots, and phosphate of iron daily, to make up for this loss. |
| " | 11-27, | 1913--Urine absolutely clear. |
| " | 11-27-28, | 1913—A slight trace of blood in urine. This day the cow was turned out and took a large amount of exercise which no doubt is the cause of the reappearance of blood in the urine. |
| | | This cow gave on an average $6\frac{1}{2}$ pounds of milk per day. At the end of the month Ferri Phosphate was discontinued. |
| March | 1, | 1913—Trace of r.b.c. in urine. |
| " | 2, | 1913— " " " |
| " | 3, | 1913— " " " |
| " | 4, | 1913—Urine clear. |
| " | 5, | 1913—Urine clear; weight, 910 pounds. |
| " | 6-12, | 1913—Trace of r.b.c. in urine; from March 1-12 cow gave average of $4\frac{3}{4}$ pounds of milk a day. |
| " | 12, | 1913—.2 per cent of blood solids in urine. Cow dry. |
| " | 14-18, | 1913—Trace of r.b.c. in urine. |
| " | 19, | 1913—.25 per cent of blood solids in urine. |
| " | 20-31, | 1913—Urine tinged at times. |

NOTES ON THE OCCURRENCE OF PETICHLE OR SPOTS ON THE MUCOUS MEMBRANES OF NORMAL BLADDERS.

In all the works I have seen on Hæmaturia, the authors mention pin point hæmorrhagic spots under the mucous membranes of the bladder, Moussu and Roger in particular. When I killed five of the experimental calves last summer I was at once struck by what I thought then were abnormal spots on the mucous membranes, and for this reason repeated the experiments of feeding and injecting urine from cases of hæmaturia into healthy calves.

In the first experiment the calves had been experimented on for three months. In the month of February I killed three more animals which had been under experiment for more than double this period and found that the spots were no larger than those noticed in the first experiment. I therefore concluded that they must be of normal occurrence. To prove this, I secured six bladders from Alberta cattle (where Hæmaturia is unknown), and found these spots to a greater or less extent in all. I also found similar spots in the bladders of pigs and sheep.

I am unable to explain exactly what these spots are, but seeing that the bladder is plentifully supplied with blood vessels, and that it is an organ which is subject to great distention and contraction, it seems natural that there must be some provision for this in the arrangement of the arteries and veins. I have not been able to find any mention of this in any literature dealing with the circulation of the bladder.

To sum up, I have no hesitation in saying that these spots are of normal occurrence and have nothing to do with Hæmaturia.

4 GEORGE V., A. 1914

NOTES ON THE LIFE-HISTORY OF *DERMACENTOR VENUSTUS* (BANKS).

| | | | |
|-------|--------|--|--|
| June | 25, | 1912—Gorged larvae collected off squirrel at Merritt, B.C. | |
| July | 18, | 1912—1 nymph hatched. | } 23 days. |
| " | 18-20, | 1912—5 nymphs hatched. | |
| " | 22, | 1912—6 nymphs put on rabbit. | |
| " | 27, | 1912—2 gorged nymphs fell off. | } 5 days. |
| " | 29, | 1912—1 gorged nymph " | |
| Aug. | 29, | 1912—1 female hatched. | } 32 days. |
| " | 29, | 1912—1 male and 1 female breaking through the skin. | |
| July | 6, | 1912—Gorged females collected by Dr. Thomson at Keremeos, B.C. | } 8 days. |
| " | 14, | 1912—Oviposition began. | |
| Aug. | 21, | 1912—Larvae hatched—36 days. | |
| Sept. | 24, | 1912—Larvae put onto rabbit. | |
| " | 28, | 1912—Larvae came off gorged (167)—4 days. | |
| Nov. | 5, | 1912—Nymphs hatched (10) first—38 days. | |
| " | 22, | 1912—Nymphs put on rabbit. (46) | |
| " | 28, | 1912—1 nymph came off gorged. | } 7 days. |
| " | 29, | 1912— " " | |
| " | 30, | 1912— " " | |
| Feb. | 20, | 1913—1 female found dead. | } 90 days. These ticks were kept in a cold room. |
| " | 27, | 1913—1 male hatched. | |
| Mar. | 4, | 1913—1 male hatched. | |

OVIPOSITION—*DERMACENTOR VENUSTUS*.

July 15, 1912—51 eggs laid.
 " 15-16, 1912—479 eggs laid.

From 12.30 noon to 3.20 p.m. 66 eggs were laid, which equals 2.5 minutes per egg.

From 5.15 p.m. to 12 noon on the following day a female laid 474 eggs, which equals 2.3 minutes per egg.

ORNITHODORUS MEGNINI.

This tick was collected by Dr. A. Watson, at Lethbridge, Alta., on jack rabbits on October 2, 1912. This finding is of some importance as there seem to be no records of this variety ever having been taken on this host. It also indicates that the tick has become established in Alberta.

Dr. Hargrave, of Medicine Hat, informed me that some years ago a shipment of cattle from the south was stopped at the international boundary, and that some of these ticks were discovered in their ears. As far as I know this is the only time the tick has ever been seen before in Canada. Dr. Watson made a careful search on the cattle in the locality in which he found the ticks, but without result.

In answer to an inquiry as to where the ticks were located, he informed me that they were found on the muzzle, and not in the ears. This is also, as far as I am aware, an observation which has not hitherto been recorded, as according to other observers they are invariably found in the ears of cattle and horses, and occasionally in man.

I am indebted to Professor Nuttall, F.R.S., for confirming the determination I had made, also for determination of *Demacentors*.

S. HADWEN.

SESSIONAL PAPER No. 15b

APPENDIX No. 10.

(E. A. Watson, V.S., Pathologist in Charge.)

VETERINARY RESEARCH LABORATORY,
LETHBRIDGE, ALBERTA, March 31, 1913.The Veterinary Director General,
Ottawa.

SIR,—I have the honour to submit herewith my report for the year ending March 31, 1913.

During this period I have been chiefly engaged in:—

I. Laboratory work and field investigation in connection with outbreaks of Dourine or *Maladie du Coit*.

II. Preliminary studies and experiments with swamp-fever.

III. The erection and fitting out of the Veterinary Research Laboratory on which I beg to state as follows:—

I.—DOURINE.

Field investigations of suspected outbreaks of dourine have taken me into various districts in the provinces of Alberta, Saskatchewan and Manitoba. Some of the suspected animals were found to be suffering from *coital exanthema* and in other instances, abortion and influenza complications had aroused suspicions of a possible dourine infection. But since employing the practical serological methods of diagnosis at this laboratory, the existence or non-existence of dourine can usually be safely and quickly determined with a specimen of blood serum taken from the suspected animal, and much time and expense have been saved in so doing.

The disputed and obscure outbreak of dourine occurring at Unity, Saskatchewan, an investigation of which I commenced in March 1912, and continued at intervals during April, May, June and July, is worthy of special mention as it proved to be an unusual type of the disease, differing in many respects from such as we have experienced in Alberta, and being of especial interest as the first outbreak of dourine in Canada in which serological methods of diagnosis were brought into practical effect and to play a very important part in determining the existence of latent infections or immune dourine carriers.

In this outbreak a symptomatic diagnosis of dourine was made by Dr. Hargrave as early as January, 1912. The infections were apparently mild ones and easily tolerated, for, a few weeks later, veterinary inspectors who were called in to make a re-examination were unable to agree on the diagnosis and were unable to detect any definite signs of the malady. Still, two months later, at my own first examination, no appreciable advance in the course of the disease could be ascertained. In fact, according to the statements made by the other inspectors who had seen the animals before, the animals were, for the most part, in rather better condition and showed less sign of infection than at the earlier examination. I noted some œdematous infiltrations of the tissues usually involved in dourine lesions in several mares and a suspicious condition of the stallion concerned, but the evidence presented, and the conflicting history of the cases, did not permit of my arriving at a conclusion. Microscopical search for trypanosomes in various preparations of the œdematous

4 GEORGE V., A. 1914

fluids was negative. Jugular blood from the stallion and one of the most likely mares was drawn and brought to the laboratory, and serological tests carried out on my return to Lethbridge. The serum in each case gave a positive dourine reaction—agglutinating dourine trypanosomes in serum dilutions down to 1 in 2,000, showing also an increased serum-globulin content by the precipitation reaction with the acetic acid test. Later on, more of the suspected mares were tested by the serum method, and a number were found to react positively. Some of the animals involved died during the course of the investigation—undoubtedly due to dourine; others developed typical dourine paralysis before they were finally disposed of. In microscopical preparations taken from one mare, I found the actual cause of the disease, namely *Trypanosoma equiperdum*.

The earlier diagnosis made by Dr. Hargrave on symptomatic grounds was, therefore, borne out by the positive serum reactions obtained during the latent periods of infection, and the reliability of the serum tests confirmed, in turn, by subsequent relapses and breaking down of the affected animals and the finding of the specific trypanosomes in one of them.

Subjoined is Table I, giving a brief synopsis of the history, clinical data, microscopical examinations and serum tests of the infecting stallion 'Florus' and a few of the covered mares that first came under observation. The stallion, no doubt became infected during the covering season of 1910. The history of this animal and the resulting outbreak is remarkable on account of the difficulties experienced in diagnosis and the long periods of latency and apparent health. In the case of the stallion, the infection took about one and a half years to develop into a definable malady, and in several of the mares it remained inactive during the period of gestation, but underwent a rapid development following parturition and during the subsequent period of physiological changes. Experience is showing that it is about this time that latent dourine may become very active and, obviously, very dangerous to contact animals. The history of this outbreak should impress one with the necessity of most careful and guarded observations on abnormal conditions among breeding horses, especially on the paralytic conditions and œdematous filling of the tissues neighbouring on the generative organs which, as in the above cases, may be the chief manifestations of the disease.

SESSIONAL PAPER No. 15b

TABLE I.—A synopsis of history, clinical data, microscopic examination and serum tests in an outbreak of dourine at Unity, Sask.

| Animal. | March 17, 1912. | Micro. exam. for trypanosomes. | Serum Test. | May 10, 1912. | Micro. exam. for trypanosomes. | Serum Test. | July 18, 1912. | Micro. exam. for trypanosomes. | Serum Test. |
|--|---|--------------------------------|-------------|--|--------------------------------|-------------|--|--------------------------------|-------------|
| | | | | | | | | | March 1913. |
| 1. Florus (W.J.B.), Belgian stallion; 5 years old. Seasons of service 1910 and 1911. | Injury to genital organs from a kick (?), serous swelling resulting. Abnormal presentation of penis. Incomplete retraction. Traces of œdema. General health and condition good. | — | + | Paraphymosis. Failing health and condition. Animal was destroyed. | — | — | | | |
| 2. Bell (W.J.B.), sorrel mare; 20 years old. In covering contact with "Florus," 1910 and 1911. | In very ill-health. Desquamative urticarial skin eruption. Pendulous underlip. Blood clots in nostrils. Indurated skin mammary region. Slight œdema of labia. | — | — | Miserable condition. Loss of limb control. Paralysis of lips, nostrils, tongue and throat. Mare destroyed. | — | — | | | |
| 3. Jess (W.J.B.), sorrel mare; 9 years old. In covering contact, 1910 and 1911. | Unthrifty condition. Papulo-squamous urticaria. No loss of control. Parts of anus and vulva leucodermic. | — | — | Condition unaltered. Jugular blood drawn for serum test. | — | + | Sudden breakdown in health. Paralysis of throat and laryngeal muscles. | | |
| 4. Maud (W.J.B.), bay mare; 8 years old. In covering contact, 1910 and 1911. | Normal health and condition. Pregnant. Slight opacity of left cornea. | — | — | Normal, and near to parturition. | — | — | Rapid breakdown after foaling. Extensive œdema, vulvar and mammary. | | |
| 5. Minnie (J.T.) bay mare; 8 years. In covering contact, 1910 and 1911. | Unthrifty condition. Papulo-squamous urticaria. Genital organs normal. Good control. | — | — | Inco-ordinate locomotion and loss of control. Mare destroyed. | — | — | | | |
| 6. Cripple (J.T.), black mare; 9 years. Covering contact, 1910. | Fair health and condition. Traces of œdema between limb and abdomen, and of mammary glands. | — | — | Fair condition. Nearing parturition. | — | — | Rapid breakdown after foaling. Loss of nerve control. | | |
| 7. Annie (L.W.), brown mare; 5 years old, 1910 and 1911. | Normal health and condition. | — | — | Traces of œdematous filling mammary region. | — | — | Fresh œdema under abdomen. | + | + |
| 8. Babe (L.W.), gray mare. | Normal health and condition. | — | — | Normal health and condition, fair. | — | — | Normal. | — | + |
| 9. Brown mare (H.J.J.), 5 years old. | Normal health and condition. | — | — | Fair condition. No clear signs. | — | + | Leucoderma, œdema and nerve symptoms. | — | + |

NOTE.—The sera of 103 horses involved in this outbreak have been tested, and of this number, 14 have positively reacted to dourine. July 15, 1913. (E. A. W.)

ON THE SERUM-DIAGNOSIS OF DOURINE.

I append herewith a paper, which I read at the annual meeting of the American Veterinary Medical Association, on the serum reactions and serum diagnosis of dourine, and which I request may be taken as a part of this report. In this paper I have described the different methods of testing the serum of infected and suspected animals, and have dwelt upon the value and reliability of the various reactions in connection with establishing a diagnosis. I promised to submit full details and figures in regard to the tests made when writing this annual report, but as we are now in the midst of a long series of tests of quarantined contacts and suspects, and are obtaining some very important data therefrom, I think it advisable to wait until these additional figures can be compiled and included in a full and comprehensive statement.

A very great amount of laboratory routine work is necessitated in carrying out these tests on a large number of animals; in fact, this work is, at present, occupying the whole of our time. Virulent strains of dourine have to be maintained in laboratory animals and the preparation of the various reagents is a delicate and tedious process. During the year, 455 laboratory animals have been used in the preparation of trypanosome antigen and in carrying on the strains; also three horses have been artificially infected to replace the three horses that succumbed to the disease and to furnish the necessary control dourine sera, which, with control normal sera, has to be included with every series of tests.

As, early in this work, we were receiving a number of spoilt or contaminated specimens of blood, it was decided to furnish inspectors with vials, needles and attachments prepared at this laboratory and sent out in a sterile condition and ready for use. The directions and precautions that I have advised in connection with sending blood for a serological test read as follows:—

Directions in taking blood for Serum Test.

Vials, needles and attachments are supplied by the laboratory, sterilized and ready for use. When not at hand, obtain a one or two-ounce vial or small bottle, wash and clean thoroughly, boil, and dry in a hot oven. The cork should be soaked in a carbolized solution, flamed or dried in an oven and inserted into the bottle while the latter is hot, and immediately on removing from oven. Thoroughly boil a large size injection or aspirating needle, preferably with a short length of rubber tubing attached, and a strong pair of scissors. Clip the hair from side of neck over the jugular vein and sponge the surface with carbolized water. Swell the vein cording the neck fairly tight, and with the scissors nick through the skin over the swollen vein. Spread open the incision and insert needle and when blood is flowing freely remove cork from vial—being careful that the cork is not in contact with an unsterilized surface during the operation—pinch the rubber tubing to stop blood flow, insert the nozzle into vial and fill almost to the level of cork. A vial should be filled quickly with freely flowing blood, not in driplets or it will coagulate too quickly and there will be no clear serum expressed. After filling and sealing, leave vial in an upright position for fifteen or twenty minutes. If left over night, keep in as cool a place as possible. Carefully number and record each vial for identification and forward by registered mail to the Veterinary Research Laboratory, Lethbridge, Alta.

It is advisable to take the temperature of the animal before blood-letting, and record same on covering report. If the animal shows fever or a rise of more than two degrees above normal, defer taking blood until the temperature has dropped.

By employing the serum test I have been able to diagnose infections with dourine in animals located at Unity, Sask., Vulcan, Alta., and Brant, Alta., and, by the negative reactions obtained with the sera of animals reported from Windsor, Ont., Cartwright, Man., Marienthal, Sask., Cardston, Alta., and from other points, eliminate the suspicions under which the animals rested.

SESSIONAL PAPER No. 15b

On the Transmission of Dourine to Laboratory Animals, and its Exalted Virulence for Equines Resulting thereby.

Between the years 1906 and 1912, in the course of my experiments on dourine, I made many efforts to transmit *trypanosoma equiperdum* from the horse to laboratory animals. Dogs, tame and wild rabbits, wild mice and gophers were inoculated time and again without success, seventy-seven of these animals proving quite resistant. I then attempted the infection of white rats with a trypanosome strain which, after ten passages through young foals, showed a very high degree of virulence for horses. Over fifty rats in all were inoculated, but with scarcely any success, for, although several rats were apparently carriers, the blood of one proving infective for a horse, I was unable to carry it on in rats by subinoculations. In November, 1912, I examined a mare at Brant, Alta., showing œdematous swellings typical of dourine. This mare was taken to the laboratory and her serum tested with an antigen prepared from a European strain of trypanosomes—that of 'Beschälseuche.' The serum was found to agglutinate these trypanosomes in dilutions to 1 in 2,000. At this time, successive crops of plaques made their appearance on the mare, and in the fluids of them trypanosomes could be found with ease. From this source white mice were at last successfully infected, although the first passage was obtained only after many failures, as may be seen in the appended table II, detailing the inoculations made. After the first passage was made, there was not the least difficulty in carrying on the strain.

TABLE II.—Showing inoculations and results of attempts to transmit horse dourine to white mice and rats.

| Numbers. | Animals. | Date. | Material inoculated. | Results. |
|----------|------------------|---------------|---|------------|
| 1—26. | White mice..... | Nov. 16, 1912 | Trypanosomes from mare No. 165. | — |
| 27—34. | " " | " 17, " | " " " " 165. | — |
| 21. | Horse | " 17, " | " " " " 165. | + Nov. 21. |
| 35—38. | White mice..... | " 21, " | " " " " 21. | — |
| 39—45. | " " | " 22, " | " " " " 165. | — |
| 46—47. | " rats. | " 22, " | " " " " 165. | — |
| 3. | Horse | " 22, " | " " " " 165. | + Dec. 12. |
| 48—50. | White mice..... | " 23, " | Jugular blood " " " 165. | — |
| 51—58. | " rats. | " 23, " | " " " " 165. | — |
| 59—62. | " " | " 27, " | Trypanosomes " " " 165. | — |
| 63—66. | " mice. | " 29, " | Blood of mice Nos. 1—5. | — |
| 67—70. | " " | " 30, " | " " " " 9—12 | — |
| 71—72. | " rats. | Dec. 6, " | " " " " 39—40. | — |
| 73—75. | " " | " 6, " | " " " " 39—40. | — |
| 76—78. | " mice | " 12, " | Trypanosomes from mare No. 3. | — |
| 79—83. | " rats | " 12, " | " " " " 3. | — |
| 84. | " mouse. | " 14, " | " " " " 165. | + Dec. 17. |

* + = Successful infection, trypanosomes in blood.

— = Negative, trypanosomes absent.

NOTE.—Mouse No. 84 was the first small animal successfully infected.

All of the surviving mice and rats, of Nos. 1-83, were, subsequent to December 17, reinoculated with trypanosomes that had passed through mouse No. 84, and every animal was then successfully infected. The blood was very rich in trypanosomes, and death occurred usually on the fourth day in mice and on the fifth day in rats. The strain has further increased in virulence and now kills rats in less than three days and mice in about forty-eight hours. Guinea-pigs and rabbits undergo a chronic and relapsing infection, guinea pigs dying in about three weeks and rabbits in about six weeks. The increased virulence of this strain for horses is more striking. Nos.

4 GEORGE V., A. 1914

3 and 21, as shown in table II, were infected with trypanosomes obtained from mare No. 165, but up to date they remain in fair health and condition, there are no discernible symptoms, and the parasites were recovered from these animals only upon two occasions; but horse No. 30, inoculated with trypanosomes from a rat, February 14, 1913, died of dourine in six weeks, the blood, drawn from any part of the body showing numerous trypanosomes during nearly the whole period, the infection being very heavy for a week to ten days before death. Further, horse No 150, immune to repeated inoculations of trypanosomes from naturally infected horses, 1910-1912, showed a heavy infection after inoculation with the rat trypanosomes on February 14, 1913, and is now dying. Finally, two dogs that licked at the carcass of horse No. 30, at the post-mortem examination, became infected with dourine and died in about six weeks.

II.—PRELIMINARY STUDIES AND EXPERIMENTS WITH SWAMP-FEVER

In September last you desired me to undertake some research work in connection with swamp fever of horses, especially along the line of establishing a laboratory method of diagnosis by which an early recognition of the disease could be made, thereby marking an important advance in the direction of control, clinical methods being of little avail until the disease has made considerable progress, and, in the case of non-clinical carriers, quite useless.

While attending the annual meeting of the American Veterinary Medical Association in August last—and I take the opportunity of thanking you for extending me the privilege—I was enabled to discuss with you, Dr. Van Es, of Fargo, North Dakota, and other authorities on swamp fever, the question of etiology and diagnosis.

On Dr. Van Es's kind invitation, I returned with him to his laboratory at Fargo, where he and his collaborators interested me very greatly with the records of many years of research work and their latest views on the etiology and diagnosis of swamp fever. Dr. Van Es was also kind enough to give me a strain of swamp fever blood, which I brought with me to Lethbridge and injected into experimental horses. The result is a relapsing type of fever in each of the experimental subjects, but the infection is a mild one, producing no symptomatic conditions outside of a rare period of fever, the animals remaining in very fair general health as non-anæmic, non-clinical carriers.

Desirous of having a more virulent strain, in its natural condition and direct from a field case, I took the matter up with Dr. J. C. Hargrave, and as a result, Inspector P. Talbot sent me a vial of blood taken from a suspected swamp fever mare, Onoway district, Alberta, west of Edmonton. Inspector Talbot's report on the mare contains the following: '— — — —fair condition; temperature, 102 F.; pulse, 45, but weak and wiry; respirations, normal;dull, peculiar look of the eye. On exertion, noticeable swaying in the animal's walk, weak over loins, getting her feet tangled as if she had not the proper use of them,' and in regard to appetite the owner stated that 'she was eating everything in sight.' Inoculation experiments with this blood showed it to be very virulent, the resulting infection in the first horse injected being of a very acute type, and death occurring in twenty-three days after two very violent exacerbations. At the next passage, to a gelding, infection was equally acute, ending fatally in eighteen days, but from then on only a chronic type has ensued in two mares, a gelding and a foal. These animals survive and are recovering health and condition and appear analogous to the non-clinical carriers of the Fargo strain.

Other investigators have had a similar experience—the loss of virulence of swamp fever strains after carrying them along by blood inoculations in horses. This is suggestive that an insect intermediary is, in nature, a possible vector of swamp fever virus, and necessary for its maintained virulence.

SESSIONAL PAPER No. 15b

I hope to have an opportunity of studying the disease in its natural environment, this coming summer, and to pay special attention to any likely insect host and transmitter.

In regard to methods of diagnosis, probably little can be done until the nature of the virus is better known. Swamp fever serum does not react to trypanosome antigen, and as trypanosome reactions are more or less included in one group reaction it appears safe to exclude swamp-fever from the trypanosome diseases. The serum globulin content of swamp fever serum is markedly increased, such sera reacting similarly to dourine sera with the acetic acid method.

I am continuing research work along the lines indicated, and as soon as sufficient data are on hand will submit a detailed report.

III.—THE NEW LABORATORY FOR VETERINARY RESEARCH.

As the little wooden building in which our laboratory work had been carried out for five years past, had become quite inadequate for continued research and serological testing, I recommended the erection of a small laboratory on modern lines and drew up and submitted for your approval plans of such a building. On October 18 and 19, you yourself visited Lethbridge and this station, looked over the site and sanctioned this much-needed improvement. Excavation work was started at the end of October, and the building completed by the end of January. The building is thirty feet in length by twenty-six feet in width and consists of a basement and ground floor, with a flat roof. It is of brick and concrete construction and is finished inside and out in a pleasing and satisfactory manner. The basement is divided into four rooms, the largest of which is occupied by an engine, machinery and dry heating furnace. In the other basement rooms are installed a high-power centrifuge, shaking apparatus, acetylene gas generator and lavatory fixtures. Also, a small photographic dark room has been fitted up. The ground floor is divided into three rooms—an office, the laboratory proper and a sterilizing room leading out of it. A Kewanee pneumatic tank system supplies water to every part of the building. This tank is placed in the basement, where it is secure against frost or freezing; the water is forced into it against air pressure, which forces the water to the different outlets under a pressure of between twenty to sixty pounds according to the amount of water in the tank. Gasoline power is used to run the pump, centrifuge machine and shaking apparatus. This is not the steadiest or most desirable power for a laboratory, but it was the best obtainable under present conditions. I hope it will be possible, in the near future, to connect with an electric plant at one of the nearby collieries, and to have the great advantage of electric power and light.

I append a photograph of the interior of the laboratory work room, also a small view of the building and surroundings.

I appreciate the increased facilities and improved conditions for veterinary research and control work afforded me by this new laboratory, and beg to thank you for all your kindly interest and encouragement in the several investigations under way.

I have the honour to be, sir,

Your obedient servant,

E. A. WATSON,

Pathologist in Charge.

APPENDIX No. 11.

SPECIAL REPORT ON CONTAGIOUS ABORTION.

(F. Torrance, B.A., D.V.S.)

WINNIPEG, MAN., July 10, 1912.

The Honourable Martin Burrell,
Minister of Agriculture,
Ottawa.

SIR,—In accordance with your instructions to investigate the disease of cattle known as Contagious or Epizootic Abortion, I left Winnipeg for England on April 17, arriving in London on the 29th.

Soon after, I called at the office of the Canadian High Commissioner and presented my letter of introduction to Lord Strathcona, whom I did not see, but whose secretary, Mr. W. L. Griffith, did everything possible to facilitate my work. Mr. Griffith introduced me to Sir Thomas Elliott, Secretary of the Board of Agriculture and Fisheries, and through him I was enabled to meet Mr. Stewart Stockman and his assistants who have conducted the investigation into the disease in question. Unfortunately, Mr. Stockman was absent on my arrival in London, being engaged investigating a disease of sheep in the north of England and I had to wait two weeks before he returned. He then asked me to visit the laboratories at Alpertton, near London, where investigations are made, and experiments carried on, in connection with any disease of animals receiving the attention of his department.

Through the courtesy of Mr. Stockman I was enabled to spend much time at Alpertton, and witnessed the methods used in the diagnosis of the disease and for the manufacture of the agent used in the production of immunity, besides learning other matters in connection with the disease.

I found all the officials very obliging and eager to do everything possible to assist me in my work, and I desire to thank them all, especially Sir Thomas Elliott and Mr. Stewart Stockman for the kindness they have shown me.

I have the honour to submit the following report:—

Contagious or epizootic abortion is a disease affecting cows, mares, sheep and swine, causing the premature birth of the young.

Its economic importance can hardly be over-estimated, and among stockmen it is looked upon as one of the most serious risks in the business. Dairymen are often heavy losers from the disease, for the affected cow not only loses her calf, but fails to produce the normal quantity of milk, and often remains a non-breeder for a considerable length of time.

In the horse-breeding industry, the losses from abortion are very considerable, widely distributed, and recur from year to year with varying severity. Both in horses and cattle, abortion is often ascribed to various causes, such as errors in feeding, exposure to inclement weather, exhaustion from over-work, excitement and direct injury, but in the opinion of those best qualified to judge, these various causes are trivial as compared with contagion. In all classes of farm stock, contagious abortion is alarmingly prevalent, and any method of controlling or limiting its ravages would be a great boon to the agriculturist.

The usual mode in which the disease is disseminated is through the introduction of an infected female into the herd. This may be an apparently healthy cow, in calf, or perhaps recently calved. Such a cow becomes a distributor of the contagion from

SESSIONAL PAPER No. 15b

the time she calves until the uterus finally cleanses itself, perhaps several months later. The foetal membranes (afterbirth) and the fluids discharged from the uterus contain vast quantities of the germs of the disease. Food soiled by these fluids may, and often does, convey the disease to healthy animals, which in their turn abort, and still further spread the infection. Infection through the mouth is now regarded as the most frequent channel. The genital passage may also give entrance to the germs, though infection is not carried by the bull to any great extent. This is contrary to the recently accepted view. The bull was regarded as one of the chief disseminators of the disease, but recent investigations have shown it to be unlikely that the bull does more than rarely convey the disease. The mouth is the most frequent channel, and infected food the carrier.

Abortion has been known to stockmen for a long time, but the idea that it may be caused by contagion is modern, and the proof of this quite recent. That abortion might be contagious was suspected over a hundred years ago. Experiments to prove it were not, however, attempted until 1878, when Lehnert produced abortion in cows by putting the discharges and foetal membranes from aborting cows into the vagina. Similar experiments were performed by other investigators, but although successful in transmitting the disease they did not discover the cause.

Professor Bang, of Copenhagen, took up the question at this stage, and, in 1897, published the results of his investigation. He announced the discovery of a micro-organism, since named the 'bacillus of Bang,' which was found in the uterus of the pregnant cow, beneath the foetal membranes. This bacillus could be cultivated outside the animal body, and when injected beneath the skin of another pregnant animal, caused it to abort.

In the year 1905 the Board of Agriculture and Fisheries of Great Britain appointed a committee to inquire into epizootic abortion. This committee took the evidence of a large number of persons as to the extent to which the disease prevailed in Great Britain, and, through its veterinary officers, conducted an investigation into the nature of the disease. Mr. Stewart Stockman, M.R.C.V.S., Chief Veterinary Advisor to the Board of Agriculture, conducted this investigation, and through his kindness, and that of Sir John McFadyen, Principal of the Royal Veterinary College, the writer was given every opportunity of learning their methods and hearing their results.

The cause of the disease was ascertained to be the same in England as in Denmark namely, the 'bacillus of Bang.' This was found in the uterus of the first cow examined, as well as in a large number of others. The characteristics of this micro-organism from a bacteriological standpoint need not be stated here. They will be found in the report of Mr. Stockman. It is sufficient to say that the bacillus is found between the foetal membranes and the uterus, sometimes in the foetal stomach, but never as yet in the foetal fluids. Apparently it produces abortion by gradually weakening or breaking down the connection between the foetus and the uterus, so that the latter is no longer able to furnish the necessary nutrition to the foetus; it dies, and is expelled.

The importance of the discovery of the cause lies in the fact that this is the first step in planning scientific methods for the diagnosis and control of the disease.

The diagnosis of contagious abortion has hitherto been a matter of great uncertainty. The infected cow often shows no premonitory symptoms, and the act of abortion itself may be the first indication of anything amiss. This has nothing about it to indicate that it differs from those ordinary cases of sporadic abortion which occur from time to time from various causes, such as accident and disease, and its contagious nature is suspected only when other cows in the herd have also 'slipped' their calves.

Cows that have aborted are sometimes dishonestly offered for sale, accompanied by a live calf which the buyer innocently thinks belongs to the cow, and this may

4 GEORGE V., A. 1914

introduce the disease to a healthy herd. A reliable method of diagnosis is therefore highly desirable.

Very good work along this line has already been done by Mr. Stockman. Experiments have been made to ascertain whether infected cows would react to a preparation made from the 'bacillus of Bang,' in the same way as a tuberculous cow reacts to an injection of tuberculin. A fluid was prepared from a pure culture of the bacillus in a manner similar to the preparation of tuberculin. This fluid, called abortin, was tried on a number of cows, and, in many cases, a reaction was produced. The results lacked uniformity, however, and another method was tried.

This method is based on the fact that the blood serum of an infected animal has a peculiar effect upon a pure culture of the organism causing the infection. When the serum and the culture are mixed together in certain proportions, the organisms are drawn together into clumps, or agglutinated, and the test is known as the agglutination test.

Applying this method for the detection of contagious abortion, it is found that the serum of an infected cow has a distinct effect, not seen when the serum of a non-infected animal is used. A large number of experiments have already been made with this method, and it appears probable that it is sufficiently reliable to be of great practical use. Further experiments are necessary before its value can be properly estimated. Should it prove accurate it will enable the stock-owner to protect himself against the purchase of an infected cow by having her submitted to this test, and the field veterinarian can verify his diagnosis by sending a sample of the blood to be tested at the laboratory. These tests are now being made extensively, and, when a sufficient number have been concluded, the results will be published and should prove extremely valuable.

The immunizing of cattle against abortion is another phase of the question which has been taken up and in which much progress has already been made. It is now possible to immunize a heifer, so that subsequent infection has no effect upon her. No successful method has been found of dealing with the pregnant female. The immunizing of heifers is, however, a most valuable discovery, and may, in the future, lead to extensions for other classes of stock.

Immunity is produced by injecting, subcutaneously, an emulsion of the living bacilli, two or three months before the heifer is to be served. The injection produces no bad effect in the heifer, and her subsequent pregnancy is normal in every respect. A demand has already arisen among the stock-owners of Great Britain for the immunizing of heifers and in the laboratory large quantities of culture were prepared for this purpose.

No attempt has hitherto been made to investigate the contagious abortion of mares, but it has been ascertained that it is not caused by the same bacillus as cattle abortion. An investigation of this kind is very necessary, but from the valuable nature of the live stock to be dealt with, would be very expensive and require a heavy outlay.

At the present I would recommend that steps be taken:—

1. To disseminate information on the subject among farmers and others, such as is contained in Leaflet No. 108 of the Board of Agriculture and Fisheries, copy of which is appended.

2. To ascertain, through the officers of the department, whether the disease in Canada is the same as in England.

3. To provide material for the immunizing of heifers when the demand arises.

4. To train some, at least, of the veterinary officers of the department in making the agglutination test.

Appended hereto are some technical notes on the bacteriology of the bacillus, the agglutination test, and the production of immunity:—

SESSIONAL PAPER No. 15b

NOTES ON THE BACTERIOLOGY OF CONTAGIOUS ABORTION.

The bacillus of cattle abortion (Bang's bacillus) is a small micro-organism, measuring from 1 to 2 microns in length, and 0.5 to 0.7 in width. It stains readily with the aniline dyes and is negative to Gram. It is non-motile. Under the microscope it appears at first sight more like a coccus than a bacillus, but a little observation discloses that it is longer in one diameter than the other. In smears from the infected uterus and in preparation cultures, containing serum, the bacilli are frequently seen in groups or masses, this tendency to congregate being one of the characteristics of the organism.

Natural habitat.—When the infected uterus is opened, with the usual precautions against accidental contamination, the bacilli are found in pure culture in the fluid lying between the uterine mucosa and the surface of the placenta. This fluid, or exudate, is more abundant about the cotyledons, is generally of a light brownish yellow colour, and may cover the entire area of the chorion. Sometimes the fluid is of a dark brown colour. The consistence of the fluid varies from that of fluid pus to a tough glutinous nature. The bacillus is also found in scrapings from the surface of the cotyledons. The stomach of the foetus frequently contains the bacillus in pure culture, 43 to 52 per cent (Stockman), but is rarely found in other parts of the foetus, and never in the fluids of the foetal membranes.

Artificial Culture.—Some difficulty has been experienced by different observers in getting the bacillus of cattle abortion to grow on artificial media. Some have advised exhausting the oxygen in a sealed jar containing the culture; others found it necessary to cultivate in a rarified atmosphere. Stockman has found it easy to cultivate on both solid and liquid media, under ordinary conditions, provided the tubes are incubated for ten days or more, the usual period not being enough.

It is unnecessary here to describe the behavior of the bacillus under all the various conditions that have been experimented with. They can be found in the report of the Epizootic Abortion Committee. Suffice it to say that after many experiments it has been found that the best medium for its growth is 'agar-glycerine-broth.' Make a potato broth, as if making beef broth, add the usual amount of beef extract and peptone, clear, add 1 per cent agar, 1 per cent glycerine and 1 per cent glucose, clear, bottle and sterilize. Cultures in this give a good growth when incubated at 95 to 100 degrees Fahr. The first growth takes place in this medium in a layer just beneath the surface. Later it spreads over the surface as a dirty gray layer.

Potato.—Cultures on potato may be obtained by planting from cultures on other media. Planting direct from the exudate is unsatisfactory. The growth is slow, appearing at first as a honey dew and gradually changing to a deep chocolate colour, greatly resembling a culture of the glanders bacillus.

Physical requirements.—The most suitable temperatures for growing the cultures are between 30 and 37 degrees C.

Agglutination Test.

This test is based on the fact that the blood serum of an infected cow has a specific effect upon a culture of the bacillus of abortion when they are mixed together in a certain proportion.

A large number of observations must necessarily be made before the reliability of this method of diagnosis can be estimated with accuracy, but from the number which have already been done it is justifiable to predict that it will be found sufficiently accurate to be of great practical value.

The technique is as follows: A series of test tubes is prepared, each containing 2½ c.c. of liquid culture of the bacillus of abortion. The serum to be tested is

4 GEORGE V., A. 1914

diluted with a measured quantity of normal salt solution and $\frac{1}{10}$ c.c. is added to each tube, varying the amount of dilution with each of the series so that they contain different dilutions in each, beginning with 1 in 25. The next is 1 in 50; the next 1 in 100, then 1 in 150, and so on through the whole series up to a dilution of 1 in 1,000. After twelve hours, the tubes are examined, and the effect of the serum is readily seen. The culture used should be fresh, about three days old, and uniformly opaque. If necessary, it should be shaken with glass beads. As a precaution against accidental contamination, $\frac{1}{2}$ per cent of carbolic acid may be added.

Fixation of the complement test.—This is another method of diagnosis, based on the same primary fact, the relation of the blood serum of the infected animal to a pure culture of the bacillus. This method has been worked out on a considerable scale at the University of Wisconsin Agricultural Experiment Station, and appears to be reliable. It is a very complicated test, however, and cannot be made use of except by highly trained observers, equipped with laboratory facilities, and, on that account, is likely to be limited in its usefulness.

Artificial Immunity.

Heifers are rendered immune to subsequent infection by injecting them with a pure culture of the bacillus of abortion two or three months before they are bred to the bull. The technique is as follows: A culture is made on agar-glycerine-broth, in an eight-ounce flat bottle which is laid on its side and incubated at 95 degrees to 100 degrees Fahr. When ripe, the culture is washed off from the surface of the agar by adding 10 to 20 c.c. of sterile water, and shaking. The water containing the microbes is then injected beneath the skin of the heifer with a hypodermic syringe. No bad results follow, and the heifer may afterwards be exposed to infection without inducing abortion. This method is now being used in England to a considerable extent and the results, so far, are good.

I have the honour to be, sir,

Your obedient servant,

F. TORRANCE.

APPENDIX No. 12.

*(H. L. Keegan, Assistant Superintendent, Experimental Farm, Agassiz, B.C.)*INVESTIGATIONS INTO THE VOIDINGS OF DAIRY CATTLE AND THEIR
NITROGEN VALUE.The Veterinary Director General,
Ottawa.

The object of these investigations with dairy cows was to determine the following points:—

1. The quantity and number of liquid voidings passed daily (24 hours).
2. The amount of solid voidings passed daily.
3. The amount of water consumed and excreted daily.
4. The amount of nitrogen consumed and excreted daily.
5. The amount of nitrogen in 1,000 pounds of fresh excrement.
6. The nitrogen value of manure from one cow annually.

The actual test was from December 14, 1912 to December 20, a period of 6 days. Three cows from the college dairy herd were used, two Holsteins and one Ayrshire.

TABLE showing the weights of the cows, taken every 10 days since October 5.

| Date. | Cow No. 157 (Ayr.) | Cow No. 119 (Hol.) | Cow No. 120 (Hol.) |
|------------------|-----------------------|-----------------------|-----------------------|
| | Lbs. | Lbs. | Lbs. |
| October 5..... | 860 | 1,185 | 1,285 |
| October 25..... | 875 | 1,212 | 1,275 |
| November 14..... | 850 | 1,212 | 1,245 |
| December 4..... | 925 | 1,190 | 1,200 |
| December 14..... | 865 | 1,215 | 1,235 |
| December 20..... | 870 | 1,205 | 1,225 |

From the foregoing table it can be seen that they were all running on without much loss or gain. All had, however, reacted to the tuberculin test, and No. 119, though not actually sick, still was not in the best possible condition; the second day of the test she had a slight rise of temperature and loss of appetite. The other two were apparently vigorous, hearty cows.

They were kept in the stable with the rest of the herd, separated from them by one stall being vacant. One stall was also left vacant between each cow. Box man-
g-ers were put in to prevent them eating each other's food, and to facilitate the collec-
tion of waste material.

TEMPERATURES of the stable during test. Fahrenheit.

| Date. | 6.30 a.m. | 11.00 a.m. | 5.00 p.m. |
|-------------------|-----------|------------|-----------|
| | Degrees. | Degrees. | Degrees. |
| December, 14..... | ..... | 49 | 50 |
| " 15..... | 52 | 51 | 50.5 |
| " 16..... | 55 | 49 5 | 51 |
| " 17..... | 47 | 46 | 42.5 |
| " 18..... | 52.5 | 52 | 51 |
| " 19..... | 50 | 49.5 | 50 |
| " 20..... | 51.5 | 51 | ..... |

All the cows in this stable had been accustomed to having water before them always, in basins, but from November 19, that is twenty days previous to this test, the supply in the basins was cut off and the cows watered from pails twice a day, and given all they would drink.

They were fed, watered, and milked at the usual times, so there was no change in this respect. They were never allowed out of the stable and, in fact, were living under exactly similar conditions as the rest of the herd. The utmost care and quietness was exercised throughout the test to avoid any undue nervousness, and to keep the cows in their normal condition.

For a considerable period previous to the test the cows had been getting a regular weighed ration; the following shows the feed fed and the approximate amounts and proportions:—

| | |
|-------------------------------------|------------------|
| Hay.. | 20 to 24 pounds. |
| Mangels.. | 30 to 40 “ |
| Dried brewer’s grains.. | 6 to 8 “ |
| Linseed meal, old process.. | 1 “ |

Their feed and water was weighed carefully and anything left over was weighed and recorded. In this way the exact amount of feed and water consumed daily for the six days was determined.

The excrement was collected on alternate days, starting at 10.45 a.m., December 15, and finishing 10.45 a.m. the following day. This time comes just after the cows have been fed, watered, and groomed and are ready to lie down until the afternoon.

Stanchions are used in this stable, and the floor is of cement, with boards (1-inch x 10-inch) for the cows to stand on.

In order to keep the voidings free from straw, chaff and dust, all bedding was previously removed and the boards swept clean.

The solid excrement fell into specially constructed galvanized iron pans, which fitted into the gutters behind each cow. These pans were five feet long, and had a flap projecting 10 inches under the boards upon which the cows stood, and another flap behind to prevent any loss of droppings through splashing; otherwise they fitted snugly into the cement gutters and were water-tight.

Each solid voiding was scraped with a hoe to one end of the pan and covered with cheese cloth to prevent evaporation. At the end of every day the contents of each pan were thoroughly mixed, weighed and a sample taken.

The liquid voidings were taken the same days as the solid, each flow was caught in a pail and measured in a 1,000 c. c. graduated cylinder, and the time taken; twenty per cent of each flow was saved in covered pails, keeping each cow’s separate. At the end of the day all were thoroughly mixed and samples taken. All samples were kept in tightly-corked glass bottles or sealers .

SESSIONAL PAPER No. 15b

FIRST TEST DAY.

Liquid voidings for 24 hours.—

Cow No. 157.—Ayrshire. Weight, 865 pounds.

1860 c.c.

2220 "

1715 "

1630 "

1320 "

8745 c.c., computed.

8640 " actual measurement.

Cow No. 119.—Holstein. Weight, 1215 pounds.

1570 c.c.

1120 "

1400 "

975 "

5450 "

1285 "

11800 c.c., computed.

11720 " actual measurement.

Cow No. 120.—Holstein. Weight, 1235 pounds.

1800 c.c.

1580 c.c.

6750 c.c.

2185 c.c.

12285 c.c., computed.

12160 " actual measurement.

SECOND TEST DAY.

Showing quantity and time of voidings (24 hours).—

Cow No. 157.—Ayrshire.—

10.45 a.m.. 1200 c.c.

2.20 p.m.. 1370 "

4.40 p.m.. 1020 "

8.35 p.m.. 1110 "

12.40 a.m.. 1530 "

5.30 a.m.. 1770 "

8.38 a.m.. 960 "

8960 c.c., computed.

8840 " actual measurement.

Cow No. 119.—Holstein.—

5.05 p.m.. 2310 c.c.

5.33 a.m.. 6150 "

8.20 a.m.. 1490 "

9950 c.c., computed.

9910 " actual measurement.

Cow No. 120.—Holstein.—

1.14 p.m.. 1850 c.c.

4.10 p.m.. 1320 "

5.45 p.m.. 6975 "

8.40 a.m.. 1420 "

11565 c.c., computed.

11450 " actual measurement.

THIRD DAY TEST.

Showing time and quantity of voidings (24 hours).—

Cow No. 157.—Ayrshire.—

| | |
|-----------------------------|-----------|
| 10.48 a.m.. | 1176 c.c. |
| 1.03 p.m.. | 975 " |
| 3.35.. | 1240 " |
| 6.25 p.m.. | 1160 " |
| 11.35 p.m.. | 2490 " |
| 5.12 a.m.. | 2450 " |
| 7.25 a.m.. | 960 " |
| 9.40 a.m.. | 850 " |
| | |
| 11295 c.c., computed. | |
| 11150 " actual measurement. | |

Cow No. 119.—Holstein.—

| | |
|-----------------------------|-----------|
| 1.20 p.m.. | 2025 c.c. |
| 5.38 p.m.. | 1770 " |
| 5.32 a.m.. | 4850 " |
| 8.31 a.m.. | 1610 " |
| 10.15 a.m.. | 1830 " |
| | |
| 12085 c.c., computed. | |
| 11950 " actual measurement. | |

Cow No. 120.—Holstein.—

| | |
|-----------------------------|-----------|
| 1.21 p.m.. | 1775 c.c. |
| 3.50 p.m.. | 1210 " |
| 2.15 a.m.. | 7100 " |
| 6.46 a.m.. | 2700 " |
| 10.05 a.m.. | 1840 " |
| | |
| 14625 c.c. computed. | |
| 14555 " actual measurement. | |

VOIDINGS of cows per day (24 hours).

| Day. | Animal. | Solid excrement. | Urine. | Total. |
|--------------|---------|---------------------|--------|--------|
| | No. | Lbs. | Lbs. | Lbs. |
| 1st day..... | 157 | 52·5 | 19·28 | 71·78 |
| 2nd day..... | 157 | 46·25 | 19·76 | 66·01 |
| 3rd day..... | 157 | 55·75 | 24·8 | 80·55 |
| 1st day..... | 119 | 71·5 | 26·03 | 97·53 |
| 2nd day..... | 119 | 41·5 | 21·94 | 63·44 |
| 3rd day..... | 119 | 65·5 | 26·65 | 92·15 |
| 1st day..... | 120 | 77·0 | 27·09 | 104·09 |
| 2nd day..... | 120 | 82·25 | 25·5 | 107·75 |
| 3rd day..... | 120 | 78·5 | 32·25 | 110·75 |

The following result is from the performance of cows No. 157 and No. 120. The record of No. 119 is discarded from this table owing to her irregularity on the second and third days.

AVERAGE number and quantity of liquid voidings passed daily by a 1,000 pound cow.

| Animal. | Number of voidings. | Amount of each flow. | Total for day. |
|----------|------------------------|-------------------------|-------------------|
| | | Lbs. | Lbs. |
| Cow..... | 6 | 4·3 | 24·2 |

SESSIONAL PAPER No. 15b

From the same data we have found the average amount of solid excrement voided daily by a 1,000 pound cow to be 57.8 pounds.

The individual samples taken daily were all tested in duplicate, first for water and then for nitrogen. The nitrogen determinations were done by the Kjeldhal process. The liquid samples for these analyses were carefully mixed before a portion was taken for testing, and the solid samples were treated with the quartering system, i. e., mixing, quartering and discarding the opposite quarters repeatedly until the material is reduced to a working amount.

The results of these analyses will be seen in the following table:—

COMPOSITION of excrement voided daily by cows.

| Animal. | Day. | Excrement. | Water. | Nitrogen. |
|----------|--------------|-------------|-----------|-----------|
| No. | | | Per cent. | Per cent. |
| 157..... | Test.... | Mixed..... | | .469 |
| 119..... | "..... | "..... | | .542 |
| 120..... | "..... | "..... | | .542 |
| 157..... | 1st day..... | Liquid..... | 92.1 | .908 |
| 119..... | "..... | "..... | 93.3 | 1.165 |
| 120..... | "..... | "..... | 92.4 | 1.041 |
| 157..... | "..... | Solid..... | 83.6 | .224 |
| 119..... | "..... | "..... | 86.9 | .325 |
| 120..... | "..... | "..... | 82.4 | .295 |
| 157..... | 2nd day..... | Liquid..... | 94.1 | 1.143 |
| 119..... | "..... | "..... | 92.7 | 1.414 |
| 120..... | "..... | "..... | 93.4 | 1.233 |
| 157..... | "..... | Solid..... | 83.9 | .242 |
| 119..... | "..... | "..... | 83.7 | .175 |
| 120..... | "..... | "..... | 84.9 | .368 |
| 157..... | 3rd day..... | Liquid..... | 93.8 | 1.043 |
| 119..... | "..... | "..... | 94.7 | 1.483 |
| 120..... | "..... | "..... | 93.6 | 1.149 |
| 157..... | "..... | Solid..... | 78.3 | .297 |
| 119..... | "..... | "..... | 83.2 | .266 |
| 120..... | "..... | "..... | 85.8 | .265 |

ANALYSIS of composite samples of milk, taken during the seven days of test.

| Animal. | Fat. | Solids. | Water. | Nitrogen. |
|----------|-----------|-----------|-----------|-----------|
| No. | Per cent. | Per cent. | Per cent. | Per cent. |
| 157..... | 3.6 | 9.1 | 90.9 | .576 |
| 119..... | 3.4 | 8.9 | 91.1 | .576 |
| 120..... | 3.0 | 8.2 | 91.8 | .576 |

The following table of analyses of foods used is taken from Professor W. A. Henry's Table of Average Percentage Composition of American Feeding Stuffs.

| Feeding Stuffs. | Water. | Ash. | Crude protein. | CARBOHYDRATES. | | Fat. |
|----------------------------------|-----------|-----------|----------------|----------------|-----------------|-----------|
| | | | | Fiber. | N-free extract. | |
| | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. | Per cent. |
| Mangel..... | 90.9 | 1.1 | 1.4 | 0.9 | 5.5 | 0.2 |
| Linseed Meal (Old process) | 9.8 | 5.5 | 33.9 | 7.3 | 35.7 | 7.8 |
| D. Brewers' Grains..... | 8.7 | 3.7 | 25.0 | 13.6 | 42.3 | 6.7 |
| Hay..... | 10.4 | 7.1 | 7.7 | 29.5 | 42.3 | 3.0 |

The crude protein is obtained by multiplying the nitrogen content by 6.25 since about 16 per cent of nitrogen is protein (100÷16=6.25).

TABLE showing amount of water consumed and excreted daily by each cow for 3 days.

| Animal. | Consumed, including water in feed. | Obtained in milk. | Voided in solid excrement. | Voided in liquid excrement. | Total in all excrement. |
|--------------|------------------------------------|-------------------|----------------------------|-----------------------------|-------------------------|
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| No. 157..... | 81.47 | 23.63 | 43.89 | 17.75 | 85.27 |
| " 157..... | 76.97 | 23.63 | 37.80 | 18.95 | 80.02 |
| " 157..... | 82.97 | 22.72 | 43.65 | 23.25 | 89.62 |
| " 119. | 116.046 | 33.7 | 61.13 | 24.28 | 120.11 |
| " 119..... | 93.802 | 26.41 | 34.73 | 20.33 | 81.47 |
| " 119..... | 121.598 | 34.61 | 54.49 | 25.23 | 114.33 |
| " 120..... | 143.65 | 47.73 | 63.44 | 25.03 | 136.20 |
| " 120. | 147.65 | 47.73 | 69.83 | 23.81 | 141.37 |
| " 120... .. | 153.65 | 47.73 | 67.35 | 30.18 | 145.26 |

Cows No. 157 and No. 119 show a loss of water, but on the intervening days of the test they consumed considerably more.

No. 120 retained from 6 to 8 pounds daily, and allowing for evaporation through the skin and the slight decrease in her consumption on the alternate days she would about even up the intake and output. On the whole, it can be assumed that the water excreted is about equal to the water consumed.

SESSIONAL PAPER No. 15b

TABLE showing amount of nitrogen consumed daily by each cow, and the nitrogen collected in the excrements (for three days).

| Animal. | Consumed in feed. | Obtained in milk. | Voided in solid excrement. | Voided in liquid excrement. | Total in all excrement. |
|---------------|----------------------|----------------------|----------------------------------|-----------------------------------|-------------------------------|
| | Lbs. | Lbs. | Lbs. | Lbs. | Lbs. |
| No. 157 | 611 | 144 | 117 | 175 | 436 |
| " 157 | 611 | 149 | 111 | 225 | 485 |
| " 157 | 611 | 144 | 165 | 258 | 567 |
| " 119 | 750 | 213 | 232 | 303 | 718 |
| " 119 | 603 | 176 | 072 | 300 | 548 |
| " 119 | 757 | 218 | 174 | 395 | 787 |
| " 120 | 763 | 299 | 227 | 282 | 808 |
| " 120 | 763 | 299 | 253 | 314 | 834 |
| " 120 | 763 | 299 | 208 | 370 | 877 |

Discarding the record of No. 119 for the second day, 38.58 per cent of nitrogen excreted was in the milk.

No. 157 retained .335 pounds nitrogen in the body and shows an increase in weight of 5 pounds.

No. 119 lost 10 pounds weight during the test, dropped in production of milk; her performance was too irregular to be valuable.

No. 120 excreted .230 pounds more nitrogen in three days than she consumed, due to the decreased quantity of feed given her; while she kept up her production of milk with a loss of body weight of 10 pounds.

The following table shows clearly the relative values of liquid and solid manure. In considering this table the kind of feed used should be noticed, as no doubt it materially affects the amounts of the constituents, though probably not to such an extent their relative proportions.

AMOUNT of water and nitrogen in 1,000 pounds of fresh excrement.

| ANIMAL. | IN SOLID VOIDINGS. | | IN LIQUID VOIDINGS. | |
|----------|--------------------|-----------|---------------------|-----------|
| | Water. | Nitrogen. | Water. | Nitrogen. |
| | Lbs. | Lbs. | Lbs. | Lbs. |
| Cow..... | 838.1 | 2.66 | 933.4 | 11.75 |

AMOUNT of manure voided yearly by a 1,000 pound cow and its nitrogen value.

| ANIMAL. | SOLID VOIDINGS. | | LIQUID VOIDINGS. | | Total Nitrogen. | Value per Year. |
|-----------|-----------------|-----------|------------------|-----------|--------------------|-----------------------|
| | Amount. | Nitrogen. | Amount. | Nitrogen. | | |
| | Lbs. | Lbs. | Lbs. | Lbs. | | |
| Cow | 21126.5 | 56.19 | 8836 | 103.82 | 160.01 | \$ 28.80 |

SESSIONAL PAPER No. 15b

SUMMARY of day in Pounds.

| Animal. | Number of Liquid Voidings. | Total for Day. | Average Amount of Each Flow. |
|-------------|----------------------------------|----------------|------------------------------------|
| | | Lbs. | Lbs. |
| No. 1 | 10 | 21.52 | 2.15 |
| No. 2 | 9 | 15.10 | 1.69 |
| No. 3 | 6 | 19.60 | 3.25 |
| No. 4 | 6 | 14.80 | 2.46 |

This experiment was started at 6 p.m. one day and finished at 6 p.m. the next day. The cows were fed on a liberal allowance of hay, mangels and bran, with all the water they would drink. These cows were all treated for Hematuria (red water) and the irritation in the bladder set up by this disease no doubt caused them to urinate more frequently than if they had been in a healthy condition. Nevertheless, these figures are interesting as they help us to realize how often and how much a cow does urinate in a day.

APPENDIX No. 13.

THE SERUM REACTIONS AND SERUM DIAGNOSIS OF DOURINE.*

*By E. A. Watson, V.S., Pathologist in Charge, Veterinary Research Laboratory,
Lethbridge, Alberta.*

Numerous efforts have and are being made to diagnose trypanosome infections by serologic methods of determining the presence of specific antibodies in the blood of the patient or animal. Several of the methods in vogue are based upon the phenomena of complement fixation or deviation which, when applied to syphilis, glanders and certain other diseases has been found in the hands of many workers to be an eminently successful test. In its application to trypanosome infections, however, literature records many disappointing results, some workers experiencing variable, not constant or non-specific reactions; but in other hands the test has been found reliable and is considered as a diagnostic aid of highest value. The discrepancy in results is doubtless due in a great measure to the different technical procedures employed by the different workers, or even to a varying or faulty technique of the individual worker, also to the use of antigens of varying qualities and consistency.

The specificity of complement fixation phenomena is dependent upon a combination of antibody and antigen of specific origin, the antibody being present in the serum of the infected patient and the antigen one of the reagents specially prepared for the test and added to the serum with the other reagents in definite quantity. One of the chief difficulties encountered in applying the test has been in finding a suitable antigen and various methods are employed in the obtaining and preparation of it; it can be extracted from the organs and tissues of infected animals and in various ways but a more satisfactory method is to extract it from the specific organism itself. It is to be hoped that a standard mode of procedure may soon be established and a uniform technique determined and rigidly adhered to by practical workers, otherwise confusing or seemingly contradictory results will continue to be recorded.

Serum reactions that appear to the writer of unquestionable value in the diagnosis of dourine are obtained by:—

First.—The complement fixation test.

Second.—An agglutination test.

Third.—A precipitin test.

Fourth.—The acetic test.

These will be considered separately.

THE COMPLEMENT FIXATION TEST.

Complement fixation as applied to dourine is similar to complement fixation tests in general, the principal difference being in the preparation of one of the reagents, namely—antigen.

To obtain antigen the blood of five, ten or more rats at the height of infection, that is to say, when the blood is swarming with trypanosomes, but before the animals

*Contribution to the report of Committee on Diseases, American Veterinary Medical Association, 1912.

SESSIONAL PAPER No. 15b

have become stupified or appear in a dying condition. is collected in one or more sterile bottles containing glass pearls and at once defibrinated. The blood is then pipetted into narrow tubes (about three-eighths of an inch in diameter), centrifuged and when the serum has become quite clear it is pipetted off, the white layers—the trypanosomes—removed from each tube into a fresh tube, with as few red corpuscles as possible. To this is added salt solution in which the trypanosomes are well shaken and again centrifuged. This process is repeated five or six times with fresh salt solution or as often as is necessary to obtain the trypanosomes absolutely free from blood or serum. When this stage is reached the trypanosome emulsion is added to salt solution in the proportion of one in ten and with sterile glass pearls is placed in a shaking apparatus for two or three days, when it is filtered through a Berkefeld, the filtrate constituting the antigen. Instead of filtering the liquid may be centrifugalized until the supernatant fluid can be taken away quite clear, but as a rule filtering is advisable.

The other reagents in the test are prepared in the usual way, fresh guinea pig's serum furnishing the complement, the serum of rabbits sensitized to sheep's blood corpuscles the hemolytic amboceptor, washed sheep's blood the corpuscle suspension, and dourine horse-serum the antibody. After titration of the amboceptor, complement and antigen the final determinative test may be undertaken as in the following table (supposing, for instance, the preliminary tests have shown that 1 to 2,500 is the proper dilution of amboceptor, 0.4 cubic centimeter the required amount of diluted complement, and 0.05 cubic centimeter of antigen).

FINAL DETERMINATION TEST.

POSITIVE CONTROL:

| Tube No. | Dourine antigen. 1:10 | Dourine serum. 1:5 | Comple- ment. 1:10 | Salt solution. 0.85% | Ambo- ceptor. 1:2500 | Sheep's Corpuscles. 1:40 |
|----------|--------------------------|-----------------------|--------------------------|----------------------------|----------------------------|--------------------------------|
| | c.c. | c.c. | c.c. | c.c. | c.c. | c.c. |
| (1) | 0.05 | 1.0 | 0.4 | 1.55 | 1.0 | 1.0 |
| (2) | 0.05 | 0.5 | 0.4 | 2.05 | 1.0 | 1.0 |
| (3) | 0.05 | 0.1 | 0.4 | 2.45 | 1.0 | 1.0 |

NEGATIVE CONTROLS:

| | | | | | | |
|-------|------|------------------|-----|------|-----|-----|
| | | Normal serum. | | | | |
| (4) | 0.05 | (x) 1.0 | 0.4 | 1.55 | 1.0 | 1.0 |
| (5) | 0.05 | (y) 1.0 | 0.4 | 1.55 | 1.0 | 1.0 |
| (6) | 0.05 | (z) 1.0 | 0.4 | 1.55 | 1.0 | 1.0 |

ANTIGEN CONTROL:

| | | | | | | |
|-------|------|-------|-----|------|-----|-----|
| (7) | 0.10 | | 0.4 | 2.50 | 1.0 | 1.0 |
|-------|------|-------|-----|------|-----|-----|

WITHOUT ANTIGEN:

| | | | | | | |
|-------|-------|-------------------|-------|------|-------|-----|
| | | Dourine serum. | | | | |
| (8 ) | ..... | 1.0 | 0.4 | 1.60 | 1.0 | 1.0 |
| (9 ) | ..... | ..... | 0.4 | 2.60 | 1.0 | 1.0 |
| (10) | ..... | ..... | 0.4 | 3.60 | ..... | 1.0 |
| (11) | ..... | ..... | ..... | 3.0 | 1.0 | 1.0 |
| (12) | ..... | ..... | ..... | 4.0 | ..... | 1.0 |

1 hour in thermostat.

2 hours in thermostat.

4 GEORGE V., A. 1914

The result is fixation of complement in the positive control (1, 2 and 3), hemolysis in the negative controls, antigen controls and control without antigen and antibody (4 to 9), and no reaction in remaining controls in which the hemolytic system is incomplete (10, 11 and 12).

With each sample of the serum to be tested for antibodies three tubes are prepared as with the positive control, the reactions compared and a diagnosis made accordingly.

AGGLUTINATION TEST.

In the previous test the presence of antibody is determined by the indirect method of combining it with antigen in order to fix or deviate the complement and prevent the otherwise normal and visible phenomena of hemolysis. In the agglutination test as applied to dourine the antibody is determined by the direct method of combining it with antigen so as to cause the visible phenomena of agglutination, which, in the absence of antibody and under normal conditions would not take place. The latter test is very much simpler than the former in its application, requiring in addition to the serum to be tested only one reagent but, nevertheless, the utmost care and precision in the details of performance. The all important reagent is the antigen, which is prepared as already described for complement fixation excepting that a homogeneous emulsion of trypanosomes is used instead of the filtrate. Essential to success is the proper condition of this emulsion; if it is found, as is sometimes the case, that there is any spontaneous or auto-agglutination of the trypanosomes in the salt solution, which may be the result of taking the blood from the rats at too late a stage of infection and when the rats are in a more or less moribund condition, to delays in the course of its preparation, improper preservation, contamination, &c., the emulsion should be discarded as worthless. It is possible to preserve the trypanosomes in salt solution by storing on ice or by the addition of a small quantity of formaldehyde for a considerable time and still find it suitable for the agglutination test but it is advisable, whenever possible, to use a fresh emulsion and without a preservative.

In making the test one employs positive and negative controls which with the sera to be tested are treated exactly alike. Stock dilutions of each serum are made in the proportion of 1 to 20, 1 to 50, 1 to 100 and 1 to 1,000 in normal salt solution, and from these a series of eleven dilutions are prepared in small narrow test tubes, each tube to contain one cubic centimeter of serum diluted as follows: 1 to 20, 1 to 50, 1 to 100, 1 to 200, 1 to 400, 1 to 800, 1 to 1,000, 1 to 2,000, 1 to 4,000, 1 to 8,000 and 1 to 10,000. A twelfth tube containing one cubic centimeter of salt solution only is added to the series. Unless the trypanosome emulsion has been just previously prepared it should be centrifuged, fresh salt solution substituted and the mixture thoroughly shaken to obtain the required homogeneous consistency. About two drops of the emulsion is then added to each tube of each series, after which each tube is separately well shaken commencing with the twelfth tube and following up to the first tube in each series; the whole are then placed in the thermostat for one to two hours at thirty-seven degrees centigrade or longer and the reactions or changes noted at half hour intervals.

The dourine or antibody—containing sera will agglutinate the trypanosomes in serum dilutions up to 1 to 2,000, 1 to 4,000, 1 to 8,000, 1 to 10,000 and even in higher dilutions when strong in antibody; the reaction may be taken as positive when agglutination occurs in dilutions to 1 to 1,000; normal and non-specific sera will agglutinate not at all or only in the lesser dilutions of 1 to 20, or 1 to 50, perhaps very rarely at 1 to 100. The control tube containing only trypanosome emulsion and salt solution should of course be free from clumping otherwise there have been errors in preparation and the test must be repeated over again.

PRECIPITIN TEST.

The precipitin test, like the agglutination test, is a direct means of determining the presence of a specific antibody. Applied to dourine in the manner following it requires only two reagents—serum and antigen. For antigen trypanosomes prepared as for the agglutination test, are then placed with glass pearls in a flask and set in the shaking apparatus for two to three days. This fluid is then centrifuged, removed from the sediment and passed through a fine Berkefeld filter. Only an extract of trypanosomes obtained absolutely clear is of value for this precipitin test.

Five tenths of one cubic centimeter of the clear antigen is placed in each of a series of tubes and to each is then added an equal amount of the different sera to be tested—specific, normal and the unknown or suspected sera.—The serum is added to each tube by means of a fine capillary pipette the point of which is passed through the antigen fluid to rest upon the bottom of the tube and the serum then slowly released so as to push up the antigen fluid without mixing with it.

If the serum contains the antibody a thin white ring appears at the point of junction of serum and antigen in from ten to fifteen minutes or earlier.

The test is still more delicate if three tubes be taken for each serum, to tube one adding five-tenths of one cubic centimeter of pure serum, to tube two the same quantity of diluted serum 1:5, and to tube three serum diluted 1:10. In such dilutions the white ring is never shown by any but dourine sera and the reaction is quite specific.

The condition of the test is that both antigen and serum must be clear and fresh.

THE ACETIC ACID TEST.

This last is purely a chemical and quantitative test for the determination of an increased globulin content of blood-serum. Noguchi*, in studying the serum reactions of syphilis, observed that the globulin fraction of the blood serum and cerebrospinal fluid is increased in syphilitic conditions, and the increase of the globulin and the appearance of the antibody are often found associated together. He states further, that in the early stages of primary syphilis, when the presence of the antibody may not be detectable, the globulin content is seen already to be increased. He has worked out a test for syphilis using butyric acid as precipitant for globulin.

I have applied the butyric acid test for syphilis to dourine in a large number of cases and with many controls, later substituting acetic acid as the precipitant and devising the method described as follows:

A centrifugal tube graduated to ten cubic centimeters is taken for each serum to be tested and for each known positive and negative control. One cubic centimeter of clear serum is placed in each tube and nine cubic centimeters of a half-saturated solution of ammonium sulphate added; each tube is then shaken and allowed to stand for one hour when they are placed in the centrifugal machine and centrifuged until the supernatant fluid has quite cleared and the globulin content is precipitated in a firm mass at the bottom. As much as possible of the upper fluid is then removed without disturbing the precipitate, to which is then added salt solution to make up the original volume of ten cubic centimeters in each tube, forming clear solutions of globulins.

In making the test each globulin solution is very carefully pipetted into five small test tubes in the following exact quantities:—

| | c. c. |
|----------------|-------|
| One. | 1.75 |
| Two. | 1.50 |
| Three. | 1.25 |
| Four. | 1.00 |
| Five. | 0.75 |

*The serum diagnosis of syphilis and the butyric acid test. H. Noguchi, 1910.

4 GEORGE V., A. 1914

To each of these is added sufficient salt solution to make up, when one cubic centimeter of ten per cent acetic acid has been further added, a total amount of three cubic centimeters in each tube. When each series of tubes has been prepared alike and shaken up they are placed in the thermostat at thirty-seven degrees centigrade to thirty-nine degrees centigrade for two to three hours; they may then be removed and the reactions read.

Normal sera will give at most a slight opalescence in tube one and, possibly, a very faint bluish tinge in tube two, the remainder staying clear even after several days. Dourine sera in a few hours will give a very marked cloudiness, which gradually becomes opaque, turbid, flocculent and finally precipitates after twenty-four hours or longer to the bottom, leaving a clear fluid above.

If more concentrated solutions are employed the reactions will occur quicker and more intensely but the differentiation is scarcely as clearly defined. The intensity of the reaction is in direct proportion to the amount of globulin present, constituting a positive or negative reaction—the former if in tube one there is turbidity or flocculence, the latter if it remains clear or is but slightly opalescent. A normal globulin content of blood serum does not give a positive acetic acid reaction. In very early stages of dourine the globulin content is increased and gives a positive reaction. A horse whose blood serum was negative to the test at the time of inoculation with dourine gave a positive reaction after fifteen days. Dourine horses give the reaction in any stage of the disease but in such cases as make a complete recovery the reaction gradually becomes less until, after many months, it is negative.

The acetic acid test is not an absolutely specific one for dourine, any more than the butyric acid test is specific for syphilis, but it probably has an even higher value in veterinary practice than the latter test in human diagnosis, for in horses we are scarcely likely to meet with any infection or pathologic condition other than dourine that will cause a positive reaction, though should we meet with such rare cases they could probably be differentiated according to the known history or clinical symptoms.

I have applied the test to cases of coital exanthema, glanders, influenza, fistulous withers and in a single case of swamp fever; only in the latter was a positive reaction obtained, the serum from this case was then used in the agglutination test for dourine and found quite negative. Perhaps the greatest value of the acetic acid test is in a negative reaction as excluding dourine infection, for in no case of dourine of known history has the reaction been other than positive. For the present, however, it seems advisable that when the acetic acid test is positive diagnosis should be controlled by one of the other tests.

The diagnosis of dourine is a matter of extreme importance and, so long as it is dependent upon clinical manifestations of the disease, one of extreme difficulty and uncertainty, and, in many cases, impossible to arrive at.

In February, 1907, at Lethbridge, Alberta, the parasite of dourine—*Trypanosoma equiperdum*—was discovered for the first time on the American continent (by Watson and Gallivan) and a strain isolated and subsequently maintained up to this date by passing it from horse to horse by experimental inoculation. The large number of horses used in carrying on this strain in addition to many other animals found naturally infected, furnished excellent material for the study of the disease throughout the whole length of its chronic course and latent stages and, at the same time, the opportunity for the serologic investigation encouraged by Dr. Rutherford in the hope of determining a specific means of diagnosing latent dourine.

Again and again during the past five years while carrying on the experimental study of dourine at the Quarantine Station, Lethbridge, as well as in various outbreaks dealt with in the field, have I obtained proof that infections are not infrequently tolerated after a short period of unrecognized activity and further propagated by non-clinical carriers who have quickly acquired a resistance or a degree of immunity that may remain unbroken for a very lengthy period; furthermore, that

SESSIONAL PAPER No. 15b

dourine antibodies are present in determinable quantities in the very early stages of infection of horses as well as in the later stages, and that the serum diagnosis of dourine is possible, practicable and reliable. Recently while working in the veterinary laboratories in Berlin on the complement fixation, agglutination and precipitin tests as employed by Professor Zwick and Dr. Winkler I was able to select dourine sera of Bulgarian infected horses and horses infected with the East Prussian strain, these sera being handed to me among other normal and non-specific sera. I was also able to again identify them by the acetic acid test with which the German workers were not familiar.

In western Canada we are now examining suspected dourine cases by the serologic method when a symptomatic diagnosis cannot be made; every month fresh proof is being obtained of the great value and reliability of these means of determining the existence of an infection by the positive serum reaction or in excluding infection by the negative reaction. Already there are cases on record in which a positive reaction to the serum tests during a suspected latent infection has been confirmed months later by the development of clinical symptoms and by the finding of the specific trypanosome in the reacting animal.

Time and space will not permit me to give in this brief paper the figures and details of the many cases studied by serologic methods; these, however, will be submitted to the Veterinary Director General of Canada for publication in his next Annual Report.

In conclusion I would say that the serum reactions of dourine as briefly outlined above have now become an important factor in the diagnosis and control of the disease in Western Canada and the outlook for stamping out infection is much more promising than it has ever been before.

I am indebted to Dr. F. Torrance, Veterinary Director General, for permission to present this paper at this meeting.

DISCUSSION.

Dr. KNOWLES: I do not think it is profitable to attempt to discuss such a highly technical paper as that which Dr. Watson has given us, but I would like to state my appreciation of the work which he has done. It places the control of this disease on a very different footing. The clinical symptoms of this disease are often so obscure as to offer almost insuperable difficulties and obstacles in the way of successful diagnosis and treatment, but as the doctor has now called our attention to a new means of diagnosis it promises to help very materially in its control. I trust in the course of some years we will be able to eradicate this serious malady of the horse.

A MEMBER: Mr. Chairman, Dr. Watson has spoken about these various methods of diagnosis, and I would like to ask at what time he succeeded in evolving these various methods of diagnosis. A man ought to have the credit of being first in a certain field of discovery, but it usually transpires that there are a number who are carrying on investigations in the same line, and it often comes to be a question of date as to when certain discoveries have been made. Dr. Watson has placed on the records by this paper a record of his investigations, but it may be that at the same time that this paper is being presented here other workers in the same field are publishing papers along the same line, and are getting the credit for them, and I would like to know for the benefit of the profession at about what date he worked these different methods out, so that any claim to any superiority to which he is entitled for his work in point of time may be understood.

The CHAIRMAN: If there are no others I will ask Dr. Watson to close the discussion.

4 GEORGE V., A. 1914

Dr. WATSON: In answer to the question as to the date and period in which these tests were worked out I would say that I think I mentioned in my paper that the work has been in progress for five years past, commencing in fact, shortly after I first succeeded in isolating and transmitting a strain of *trypanosoma equiperdum*, in February, 1907. Observing in some of the horses inoculated with this strain a marked tolerance and, in several cases, a rapidly acquired immunity to infection I began a long series of experiments with dourine sera ascertaining the presence of specific antibodies, agglutinins and precipitins. I believe this to be the first attempt made at the serum diagnosis of dourine of horses. This experimental work was pursued for three to four years and in the period of 1910-11 I devised and worked out the acetic acid test (based on Noguchi's butyric acid test for syphilis) for the serum-globulin content of dourine sera. Owing to frequent interruptions in the work from the necessity of having to promptly deal with and control field outbreaks of the disease, the practical results of serum diagnosis and the formulating of reliable and constant methods have been slow in forthcoming. At first, as it always appears to the inexperienced worker, the technique involved in the serologic test appeared too difficult and complicated to be put to a practical use, besides which, other investigators were publishing from time to time unfavourable accounts of the serum diagnosis of trypanosome diseases. In 1911, however, several German workers, notably Zwick, Winkler and Lange solved the chief difficulty, namely, the preparation of a reliable antigen. Last winter I worked with Zwick and Winkler in Berlin, studying their technique with my own, and found their method of preparing trypanosomes for antigen—as described in this paper—superior to any other, and having adopted it on my return to Canada in March, 1912, I have since employed it in a large number of tests with very satisfactory results.

SESSIONAL PAPER No. 15b

INDEX.

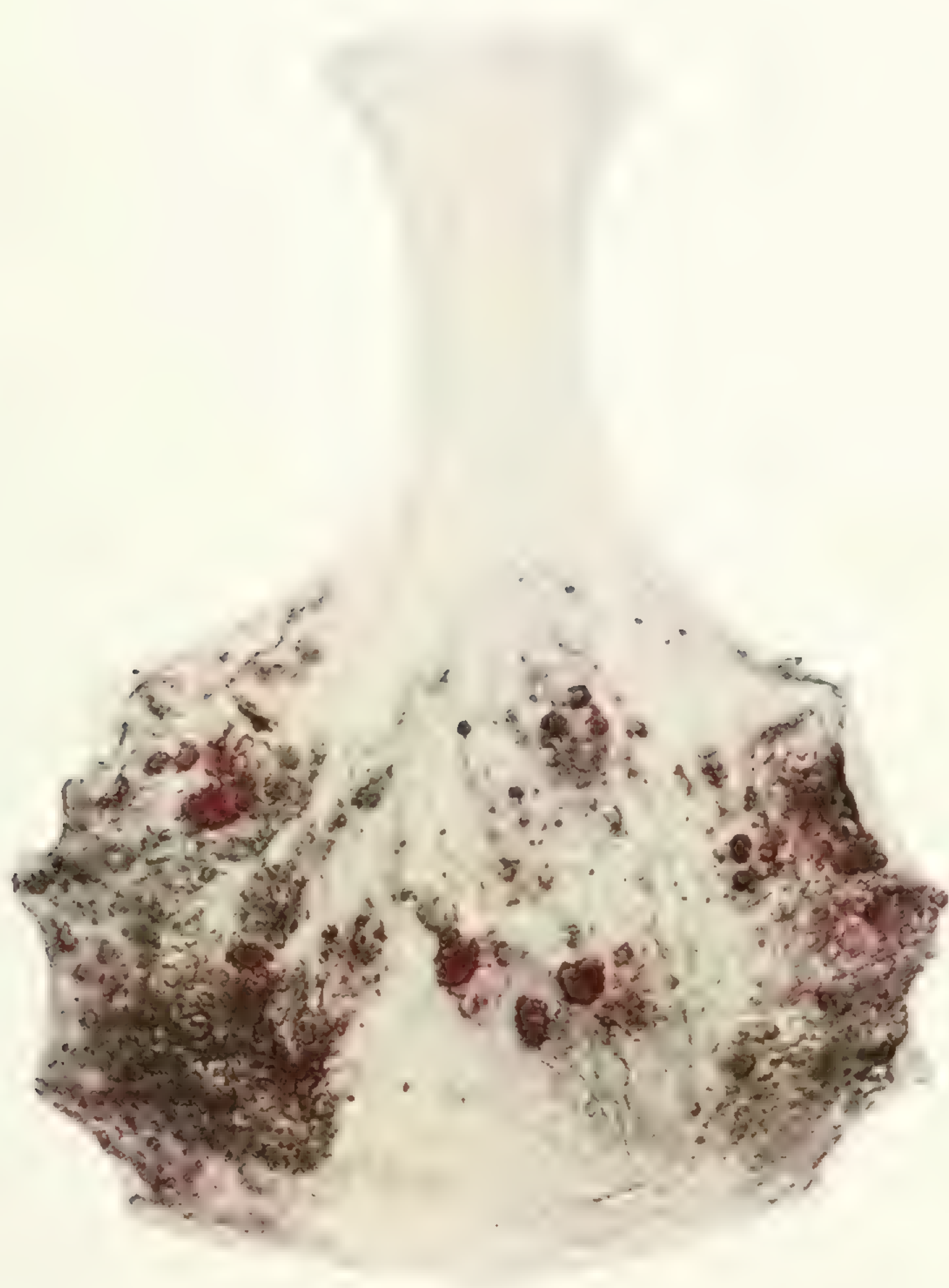
REPORT OF THE VETERINARY DIRECTOR GENERAL.

| | PAGE. |
|---|--------|
| Abortion, Contagious..... | 14 |
| Special Report on, by F. Torrance..... | 88-92 |
| Alberta, Report of Veterinary Inspector in Charge..... | 61-64 |
| Anthrax..... | 12 |
| Anthrax Statistics..... | 12 |
| Anthrax Vaccine..... | 12 |
| Barnes, Dr. R. Report of..... | 38-42 |
| Biological Laboratories..... | 14, 87 |
| Blackquarter..... | 12 |
| Blackquarter Vaccine Statistics..... | 12 |
| British Columbia, Report of Veterinary Inspector in Charge..... | 65-66 |
| Cattle Mange..... | 10 |
| Cattle Mange Statistics..... | 10 |
| Condensed Milk, Fruit and Vegetables..... | 22 |
| Contagious Abortion..... | 14 |
| Dairy Cattle, Voidings of, Special Report by H. L. Keegan..... | 93-101 |
| Diseased Import Statistics..... | 19 |
| Diseases found at Establishments under Inspection..... | 27-28 |
| Dourine..... | 11 |
| Dourine, Report on, by E. A. Watson..... | 81-86 |
| Dourine, Serum Reactions and Serum Diagnosis, Special Report on, by E. A. Watson, 102-108 | |
| Dourine Statistics..... | 11-12 |
| Establishments under Inspection, Meat Inspection..... | 24-26 |
| Export Inspection Statistics..... | 20 |
| Export Rejection Statistics..... | 20 |
| Fruit, Vegetables and Condensed Milk..... | 22 |
| Gelatin..... | 70 |
| General..... | 3 |
| Glanders..... | 3, 70 |
| Glanders Statistics..... | 4-6 |
| Hadwen, D. V. S., S. Report of..... | 74-80 |
| Haematuria, Report on by S. Hadwen, D.V.S..... | 79 |
| Hargrave, J. C., Report of..... | 61-64 |
| Higgins, C. H., Report of..... | 67-73 |
| Hilton, G., Report of..... | 30-37 |
| Hog Cholera..... | 6 |
| Hog Cholera Statistics..... | 7-9 |
| Horse Mange..... | 11 |
| Horse Mange Statistics..... | 11 |
| Import Inspection Statistics..... | 16-17 |
| Import Pure Bred Statistics..... | 17-18 |
| Import Rejection Statistics..... | 19 |
| Import Testing Statistics..... | 15 |
| Mange in Cattle..... | 10 |
| Mange in Cattle Statistics..... | 10 |
| Mange in Horses..... | 11 |
| Mange in Horses Statistics..... | 11 |
| Manitoba, Report of Veterinary Inspector in Charge..... | 46-53 |
| Meat Inspection, Diseases found at Establishments under Inspection..... | 27-28 |
| Meat Inspection, Establishments under Inspection..... | 24-26 |
| Meat Inspection, Staff..... | 22-23 |

4 GEORGE V., A. 1914

| | |
|---|---------|
| Moore, A. E., Report of..... | 43-45 |
| Poultry Diseases..... | 71-73 |
| Publications..... | 28-29 |
| Pure Bred Import Statistics..... | 17-18 |
| Quarantine Stations..... | 15 |
| Rabies..... | 13 |
| Rabies Statistics..... | 13 |
| Red Water..... | 14 |
| Red Water, Report on, by S. Hadwen, D.V.S.... | 74-79 |
| Report of G. Hilton, Chief Veterinary Inspector..... | 30-37 |
| " R. Barnes, Chief Meat Inspection..... | 38-42 |
| " A. E. Moore, Chief Travelling Inspector..... | 43-45 |
| " C. D. McGilvray, Insp. in Charge, Manitoba..... | 46-53 |
| " D. Tamblyn, Inspector in Charge, Saskatchewan..... | 54-60 |
| " J. C. Hargrave, Inspector in Charge, Alberta..... | 61-64 |
| " S. F. Tolmie, Inspector in Charge, British Columbia..... | 65-66 |
| " C. H. Higgins, Pathologist, Ottawa..... | 67-73 |
| " S. Hadwen, Pathologist, Agassiz, B.C..... | 74-80 |
| " A. E. Watson, Pathologist, Lethbridge, Alta..... | 81-87 |
| Saskatchewan, Report of Veterinary Inspector in Charge..... | 54-60 |
| Sheep Scab..... | 11 |
| Sheep Scab Statistics..... | 11 |
| Special Report on Contagious Abortion by F. Torrance..... | 88-92 |
| Special Report on Voidings of Cattle by H. L. Keegan..... | 93-101 |
| Special Report on Serum Reactions and Serum Diagnosis..... | 102-108 |
| Staff..... | 20-21 |
| Staff, Meat Inspection..... | 22-23 |
| Statistics re Anthrax.. | 12 |
| Anthrax Vaccine..... | 12 |
| Blackquarter..... | 12 |
| Diseased Imports..... | 19 |
| Dourine..... | 11-12 |
| Export Inspection..... | 20 |
| Export Rejection..... | 20 |
| Glanders..... | 4-6 |
| Hog Cholera..... | 6-9 |
| Import Inspection..... | 16-17 |
| Import Rejection..... | 19 |
| Import Pure Bred..... | 17-18 |
| Import Tests..... | 15 |
| Mange in Cattle..... | 10 |
| Mange in Horses..... | 11 |
| Meat Inspection..... | 27-28 |
| Rabies..... | 13 |
| Sheep Scab..... | 11 |
| Tuberculosis..... | 10 |
| Stock Cars..... | 30 |
| Swamp Fever..... | 14 |
| Swamp Fever, Special Report on, by E. A. Watson, V.S..... | 86-87 |
| Tamblyn, D. S., Report of..... | 54-60 |
| Ticks, Report on by S. Hadwen..... | 80 |
| Tolmie, S. F., Report of..... | 65-66 |
| Tuberculosis..... | 9, 71 |
| Tuberculosis Statistics..... | 10 |
| Vegetables, Fruit and Condensed Milk..... | 22 |
| Voidings of Dairy Cattle, Special Report by H. L. Keegan..... | 93-101 |
| Water Examinations..... | 70-71 |
| Watson, E. A., Report of..... | 81-87 |

ILLUSTRATIONS



HÆMATURIA

BLADDER OF COW NO. 35

Photo—S. Hadwen

PLATE II



Cow No. 35 just before death.
Redwater.

PLATE III.



Interior of Veterinary Research Laboratory, Lethbridge, Alta.

PLATE IV.



Veterinary Research Laboratory, Lethbridge, Alta.

